THE
Practical Teacher
A MONTHLY EDUCATIONAL JOURNAL.
Edited by JOSEPH HUGHES.

'*Knowledge is proud that he has learned so much,*
Wisdom is humble that he knows no more.'—COWPER.

VOL. VIII. No. 9. NOVEMBER, 1888. PRICE, 6D. POST FREE, 7½D.

Pestalozzi.

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CHAPTER VI.—*continued.*

With 'Father Pestalozzi,' as with the aged survivor of the twelve Apostles, religion seemed to resolve itself into the single element of love; but, unlike him, Pestalozzi believed in a natural birth-tendency in the child towards what is good and holy, requiring only to be protected in its development from the corrupting influences of the world. Allusion has already been made to his favourite theory that all education is founded on the relationship which subsists between the infant child and the mother. 'The feelings of gratitude, confidence, and love in the child towards the mother,' he tells us, 'gradually unfold themselves, and are at a later period transferred by the child, on the admonition of the mother, to God.' To this Dr. Mayo eloquently adds:—'The great means to be employed in moral development Pestalozzi held to be love. The mother's love draws out the child's love; the mother's care and tenderness awaken the first dawnings of faith; the child feels safe in her arms; he confides in her word; what she says he believes, and her will is the law to which he yields, and which he obeys. Thus it is in the mother's arms that the moral character is first developed, and moral education passes its first stage. Rightly to direct and exercise the nascent faculties and sentiments is the next point, and here, God Himself, our Heavenly Father, as early as possible, must be presented as the first object of love, His superintending Providence as the object of faith, and His will as the rule of life.'* A beautiful, we will not say, an *ideal* picture—for, thank God! the experience of most of us will testify that it can be, and has been, realised; but alas! it presupposes the mother—the average mother, be it remembered—as pure and innocent as the new-born child, enfolding it, like an angel, under her wings, and enshrining it safe, in the sanctuary of an unruffled bosom, from all the coarseness and defilements of the outer world. Pestalozzi, however, always regarded this idea with peculiar affection, as the first and best of his 'discoveries.' He says, 'I should not anticipate half the good results of our system for the benefit of mankind so long as it failed of extending to the earliest stage of education; and, to make it do this, we require the co-operation of the most powerful ally of our cause, so far as human power may contribute to an end which Eternal love and wisdom have designed:—the object of our ardent desires will never be obtained but through the assistance of the mothers.' Upon this passage, a well known English Pestalozzian* observes, 'The estimate which Pestalozzi formed of this "prize," the tenacity with which he held it, and the place which he assigned it in his system ought to be thoroughly realised.' It took that undivided possession of his mind which a familiar thought will sometimes acquire from a novel combination. It inspired him with the most sanguine hopes; it was from that moment the nucleus, the luminous centre of all his efforts, and the foundation of his system of moral influence and moral elevation. But in time Pestalozzi became dissatisfied here, and he then made his final discovery. He would carry the parental feeling into the schoolroom, and convert the schoolroom into a home. He saw that the family was the original school—God's model school in the beginning of the world. The trainers of children, according to the order of nature, are their parents, their brothers and sisters. 'And depend upon it,' he came to assert, 'just so far as we fail to conform the school to a family, in spirit and character, it will be imperfect, it will bear the impress of human, not of divine wisdom?' We are justified then in saying that it was one of the first principles of Pestalozzi's system that all *education must be essentially of a parental character.*

Pestalozzi's Principles.

(2.) Had we been strictly following the order of importance, the foremost place among Pestalozzi's principles should undoubtedly have been assigned to the next axiom, or

* In the 'Evening Hours of a Hermit' (see page 10), Pestalozzi says, in language of real beauty, though perhaps of questionable orthodoxy: 'Faith in God is the pure sense of simplicity—the ear of Innocence listening to the voice of Nature proclaiming the Fatherhood of God.'

* Mr. Dunning.

BRITISH MUSEUM

'discovery,' as he would perhaps have called it; which, in fact, underlies all the rest, and has done more to revolutionize our modern systems than the whole of them put together;—namely, *All education must be founded upon a knowledge of the nature of the child, and must follow the natural order of the development of the human faculties.*

The artist must be acquainted with the subject-matter of his art, which, in the case of the educator, is the mind of childhood—'the study of the mind itself must form the basis of the science which aims at developing it.' And the true teacher must be not only a mental analyst, but a student of character; for in different individuals tastes and faculties are developed in a different order, and it will be necessary for him to know when to apply to each of them encouragement or guidance, or restraint. The mind is a living organism with laws of its own, for its growth, nutrition and development; its treatment must be in harmony with these laws. The physician has long since discovered that he can only assist the efforts of nature; the cultivator, that he can create nothing in, can add nothing to, the plant, but only contribute to its proper development by protecting the tender germ from all injurious influences, and by supplying it with the nourishment best suited for its growth. So it is with the cultivator of the mind—he works under the same conditions; and therefore, in selecting the proper nutriment for its development he should attach their relative importance to the different subjects of elementary instruction, not so much for their own sake as for the educative power which they severally possess; he should regard the mind of his pupil, not so much in the light of a receptacle for knowledge, as of an instrument which can be made more or less perfect for the acquisition of knowledge for itself.

(To be continued.)

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Quarterly Arithmetical Tests.

STANDARD I.—FIRST QUARTER.

1. 43, 506, 8, 71, 260

2. 659, 654

3. 975, 301

4. 2 × 7; 11 × 3; 4 × 10.

SECOND QUARTER.

1. 319, 7, 893, 50, 4

2. 413, 207

3. 500, 40

4. 8 × 6; 3 × 9; 12 × 4.

THIRD QUARTER.

1. 42, 908, 763, 85, 437

2. 172, 75

3. 804, 798

4. 5 × 12; 7 × 4; 6 × 9.

STANDARD II.—FIRST QUARTER.

1. From 30,506 take 9,380.
2. 609 + 5,870 + 29,046 + 7 + 8,312 + 54.
3. Multiply 48,076 × 95.
4. 49d.; 67d.; 82d.

SECOND QUARTER.

1. 53, 817 × 370.
2. 19,628 ÷ 4. Write the answer in words.
3. How many boots do 37 boys and 49 girls wear altogether?
4. 71d.; 98d.; 114d.

THIRD QUARTER.

1. 88,080 ÷ 9.
2. 96,570 × 168.
3. I divided fifty-six thousand five hundred and eight marbles equally among a dozen boys; how many did each boy get?
4. 106d.; 123d.; 137d.

STANDARD III.—FIRST QUARTER.

1. 164,115 ÷ 45.
2. 796,058 × 970.
3. How often is 638 contained in six hundred and twenty-five thousand two hundred and forty?
4. A farmer sold 2,330 sheep. He sold 68 to one person, and 58 each to the other persons. How many buyers were there?

SECOND QUARTER.

1. Add together £4,000 10s. 1½d., £539 16s. 7d., 18s. 11½d., £17 0s. 8½d., £48 15s. 10¼d., £304 13s. 5d., and £7 19s. 9¾d.
2. A train runs 8 hours a day and 35 miles an hour; how far would it run in 1,295 hours?
3. From £307 14s. 6d. take £298 18s. 5¼d.
4. What was gained by buying 27 dozen eggs at 8d. a dozen, and selling them at a penny each?

THIRD QUARTER.

1. Take fifty-nine thousand seven hundred and forty-six pounds fifteen shillings and two pence three farthings from half a million pounds and a farthing.
2. Divide a million by four thousand five hundred and sixty-seven, and prove the sum.
3. Find the sum of seventy-eight thousand and fifty-six pounds eighteen shillings and ten pence, nine pounds nineteen shillings and three pence three farthings, sixteen shillings and eleven pence farthing, three hundred and five thousand and seven pounds thirteen shillings and sixpence three farthings, seventeen shillings and seven pence halfpenny, and ninety thousand six hundred and eighty pounds twelve shillings and eight pence farthing.
4. A boy had two florins and half-a-crown. What had he left after paying for 5 lbs. of sugar at 3d. a pound, and 2 lbs. of butter at 1s. 4d. a pound?

STANDARD IV.—FIRST QUARTER.

1. Multiply fifteen shillings and three farthings by one hundred and seven.
2. £156 17s. 9½d. ÷ 159.

3. What is the cost of 384 articles at £29 14s. 10½d. each?

4. Divide one hundred and forty thousand six hundred and twenty nine pounds ten shillings and two pence halfpenny by six hundred and seventy.

SECOND QUARTER.

1. How much was paid for 13 sheep, each weighing 79 pounds, at 5¾d. a pound?

2. Reduce two hundred thousand and thirty seconds to days.

3. If 39 lbs. of butter cost £1 17s. 4½d., what was the cost of a lb.?

4. How many lbs. are there in 29 tons 3 stone 9 lbs. of iron?

THIRD QUARTER.

1. Reduce nineteen thousand and fifty pints to bushels.

2. What is the difference in halfpence between 170 threepenny pieces and 95 sixpences?

3. How many miles could I walk in 7 hours, if I walk 132 yards in a minute?

4. A sofa and half a dozen chairs cost 20 guineas. The sofa cost £4 5s. 6d.; find the cost of each chair.

STANDARD V.—FIRST QUARTER.

1. What will 839 acres cost at £1 16s. 4½d. per acre?

2. Find the cost of 17 sq. yds. 7 ft. 126 in. at half a guinea a square yard.

3. What is the value of 2,345 articles at £2,345 8s. 10½d. each?

4. Find the wages of a housekeeper for 29 weeks 4 days 10 hours at 5s. 3d. per day.

SECOND QUARTER.

1. Make out a bill for the following:—
   11 yards flannel at 1s. 2¾d. per yard;
   17½ yards calico at 9½d. per yard;
   5 pairs of boots at 5s. 9d. per pair;
   3 pairs of kid gloves at 1s. 11½d. per pair;
   1½ doz. table napkins at 1s. 3d. each.

2. If a ham, weighing 34 lbs., cost £1 1s. 3d., what would it have cost if it had been 5½ lbs. lighter?

3. Bill:—
   350 oranges at 3s. 6d. per hundred;
   7½ doz. Seville oranges at 2 for 1½d.;
   5 pecks of plums at 1s. 5½d. per gallon;
   9 stone of potatoes at 1½d. per lb.;
   11 lbs. of apples at 2s. 11d. per stone.

4. How many weeks will it take to spend £674 2s. at the rate of £1 15s. 8d. in a fortnight?

THIRD QUARTER.

1. $\frac{3}{5} + \frac{5}{6} + \frac{1}{4}$.

2. If I change 7 to 6 in the fraction one-seventh, how much greater do I make it?

3. If an 18 gallon cask of ale last 19 weeks 1 day, how many pints are consumed in 2 days?

4. If 9 lbs. of rice be worth 7 lbs. of sugar, and the rice was £1 15s. per cwt., what was the price of the sugar per cwt.?

STANDARD VI.—FIRST QUARTER.

1. What fraction with 20 as denominator is equal to $\frac{5\frac{1}{4}}{7}$?

2. (1,900 × ·54) ÷ (¼ of 1·216).

3. Simplify:— $\frac{1\frac{2}{7} + \frac{3}{8} \text{ of } 2\frac{2}{3}}{2\frac{1}{3} - 1\frac{1}{14} \text{ of } \frac{3}{5}}$.

4. Multiply ·497 by ·63.

SECOND QUARTER.

1. The face of a clock is 27½ inches in circumference. What decimal of a mile will the minute hand travel during the month of November?

2. If £3½ buy 4⅜ gallons, how much will £7¼ buy?

3. From 2·65 of half-a-crown take 3·875 of a shilling and sixpence.

4. A person had 13 guineas; he gave ⅜ of the amount to A, ⅝ of the remainder to B, and the rest to C. What did each receive?

THIRD QUARTER.

1. If ⅜ of a lb. cost 2s. 9½d., what will ⅝ cwt. cost?

2. Find the simple interest on £690 for 4½ years at 4⅓ per cent.

3. What decimal of £4 15s. is ⅜ of ⅗ of 1s. 7d.?

4. At what rate per cent. will £90 amount to £139 10s. in 5⅓ years?

STANDARD VII.—FIRST QUARTER.

1. How many horses are required to plough 75 acres in 9 days, if 6 horses plough 20 acres in 4 days?

2. What is the half year's interest on £49·375 at 4½ per cent.?

3. If the tax on £750 is £16, what is the tax on £487 10s., when the tax is half as much again?

4. Divide £3 11s. 6d. between two men in the proportion of 7 to 6.

SECOND QUARTER.

1. The average rate of mortality of a town for seven years was 439. The death rates for six years were 305, 492, 286, 573, 420, and 637. What was the death rate for the 7th year?

2. If 1¼d. is the interest on a crown for 4 months, what is that per cent. per annum?

3. A man travelled 7½ hours at 19 miles an hour, 13¾ hours at 16 miles an hour, 9½ hours at 10 miles an hour, and 5 hours at 7 miles an hour. What was his average rate of travelling per hour?

4. Two men with equal incomes live in different towns, and are rated at 3s. 6d. and 2s. 11d. in the pound respectively. One pays £17 4s. 2d. more than the other in rates. What is their income?

THIRD QUARTER.

1. Which is the greater percentage, and by how much, 9 out of 1,000, or 1 out of 99?

2. If I mix 25 lbs. of tea at 3s. per lb. with 18 lbs. at 2s. 6d. per lb., and sell the mixture at 3s. 9d. per lb., what do I gain per cent.?

3. If the length of a room be 19 ft. 9 in., and the area be 31 sq. yds. 7 ft. 54 in., what is the breadth of the room?

4. A woman buys eggs at 7 for 4d., and sells them at 9d. per dozen; find her gain per cent.

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	888.	1,273.	2,235.
2.	5.	206.	97.
3.	674.	460.	6.
4.	14; 33; 40.	48; 27; 48.	60; 28; 54.

STANDARD II.

	FIRST.	SECOND.
1.	21,126.	19,912,290.
2.	43,898	4,907.
3.	4,567,220.	172 boots.
4.	4s. 1d.; 5s. 7d.; 6s. 10d.	5s. 11d.; 8s. 2d.; 9s. 6d.

THIRD.

1. 9,786 + 6.
2. 16,223,760.
3. 4,709 marbles.
4. 8s. 10d.; 10s. 3d.; 11s. 5d.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	3,647.	£4,919 15s. 5¾d.	£440,253 4s. 9½d.
2.	772,176,260.	45,325 miles.	218 + 4,394.
3.	980 times.	£8 16s. 0¾d.	£473,756 18s. 11½d.
4.	40 buyers.	9s.	2s. 7d.

STANDARD IV.

	FIRST.	SECOND.
1.	£80 1s. 8½d.	£24 12s. 1½d.
2.	19s. 8¾d. + 41q.	2 days 7 hrs. 33 min. 50 sec.
3.	£11,421 4s.	11½d.
4.	£209 17s. 10¾d.	65,011 lbs.

THIRD.

1. 297 bus. 2 pks. 1 gal. 1 qt.
2. 120 halfpence.
3. 31½ miles.
4. £2 15s. 9d.

STANDARD V.—FIRST.

1. £1,525 18s. 7½d.
2. £9 7s. 8½d.
3. £5,500,063 3s. 0½d.
4. £54 8s. 11½d.

SECOND.

1. 13s. 6½d. + 13s. 10½d. + £1 8s. 9d. + 5s. 10½d. + £1 2s. 6d. = £4 4s. 6d.
2. 17s. 9¾d.
3. 12s. 3d. + 5s. 7½d. + 14s. 7d. + 15s. 9d. + 2s. 3½d = £2 10s. 6d.
4. 756 weeks.

THIRD.

1. $1\frac{13}{15}$.
2. $\frac{3}{11}$.
3. 4½ pints.
4. £2 5s.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	$\frac{1}{16}$.	·3125.	£35.
2.	3,375.	9¾ gallons.	£134 11s.
3.	$1\frac{4}{11}$.	9¾d.	·002.
4.	·3167.	A £5 17s., B £6 10s., C £1 6s.	10 per cent.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	10 horses.	360	1 out of 99 by $\frac{100}{9900}$ or ·1̇0̇ per cent.
2.	£1 2s. 2¼d.	6½ per cent.	34⅜ per cent.
3.	£15 12s.	$13\frac{11}{17}$ miles.	14½ feet.
4.	£1 18s. 6d. and £1 13s.	£590.	31¼ per cent.

Tests in Mental Arithmetic.

STANDARD I.

1. How many times does a clock strike from 1 to 6? 21.
2. How many are five times five and 4 more? 29.
3. What is the difference between 37 and 53? 16.
4. Find the cost of 16 oranges at two for three halfpence. 1s.
5. How many farthings would that be? 48.
6. If I had a shilling, and bought 4 pounds of rice at 2d a pound, how much should I have left? 4d.
7. How many is a quarter of 100? 25.
8. How many half-pennies are there in 25 pence? 50.
9. How many sixpences could you get for 7 half-crowns? 35.
10. There are 35 buns in a box; how many times could I take out 4 at a time? 8.
11. How many would be left? 3.
12. How many inches are equal to 1½ feet? 18.

STANDARD II.

1. From 8 times 9 take 12. 60.
2. What is the cost of 60 oranges at 3 a penny? 1s. 8d.
3. How many farthings are equal to that amount? 80.
4. I have 3 dozen nuts. How many more do I require to give 7 boys 7 each? 13.
5. Find the cost of 1½ lbs. of butter at 1s. 6d. a lb. 2s. 3d.
6. What change would be received out of a crown? 2s. 9d.
7. How long would this last if I spend 3d. a day? 11 days.
8. How many sixpences are equal to a guinea? 42.
9. Take 4 florins from 2 crowns. How many pence are left? 24.
10. How many sixpences could you get for 4 florins and 2 crowns? 36.
11. How many months are there in five years? 60.
12. Add the first eight digits together, and divide by 12. 3.

STANDARD III.

1. How many shillings are there in 3 guineas? 63.
2. What is the half of 63? 31½.
3. Find the cost of 4 books at 1s. 9d. each. 7s.
4. What change would be received out of 3 half-crowns? 6d.
5. Find the cost of 7 lbs. of sugar at 3½d. per lb. 2s. 0½d.
6. How many farthings are equal to that? 98.
7. What is the cost of 50 penny stamps and 50 half-penny stamps? 6s. 3d.
8. How many inches are there in 1½ yards? 54.
9. How many yards are there in half a mile? 880.
10. Find the cost of 3½ qts. at 3d. a quart. 10½d.
11. How much short of a gallon is that? 1 pint.
12. If I walk 12 miles in 3 hours, how far do I walk in 30 minutes? 2 miles.

STANDARD IV.

1. How many lbs. are there in ¾ cwt.? 84.
2. Find the cost of 84 oranges at 9d. a dozen. 5s. 3d.
3. How many threepences are there in that amount? 21.
4. If eggs are 1½d. each, how many could you get for half-a-crown? 20.
5. What are a week's wages at 5s. a day, reckoning half a day for Saturday? £1 7s. 6d.
6. How long would 3 tons 12 cwt of coal last, if 2 cwt. be used weekly? 36 weeks.
7. How much is that short of a year? 16 weeks.
8. How many lunar months are equal to that? 4.
9. What is two-fifths of a sovereign? 8s.
10. How many lbs. of soap at 4d. a lb. will this buy? 24.
11. How many more lbs. are required to make 3 stone? 18.
12. If 3 lbs. of sugar cost 7d., what would 15 lbs. cost? 2s. 11d.

STANDARD V.

1. If I write a page in 15 minutes, how much could I write in 6 hours? 24 pages.
2. What part of a day is 3 hours? ⅛.
3. How many sixteenths are required to make this fraction unity? 14.
4. Find the cost of a thousand pencils at twenty a penny. 4s. 2d.
5. If a cwt. cost a sovereign, what will 7 lbs. cost? 1s. 3d.
6. What is the value of 3 dozen eggs at 1s. 3d. a score? 2s. 3d.
7. From square of 13 take square of 12. 25.
8. If 4 yards cost a guinea, what would 9 yards cost? £2 7s. 3d.
9. If 7 men earn £25, how much would 63 men earn? £225.
10. How many eggs could be bought for 4s. 3d. at 16 for a shilling? 68.
11. What dividend will be received on a debt of £475, if the debtor pay 2s. 6d. in the £? £59 7s. 6d.
12. If 25 per cent. were taken off the price of an article marked 5s., how much was paid for it? 3s. 9d.

STANDARDS VI. AND VII.

1. Add together a fifth and half a fifth. $\frac{3}{10}$.
2. Find the sum of ½, ¼, ⅛. $\frac{7}{8}$.
3. From 80 take 79·956. ·044.
4. What decimal of a yard is 3 inches? ·083.
5. Find the value of ·375 of a guinea. 7s. 10½d.
6. Divide ·54 by ·006. 90.
7. What is the amount of £600 for six months at 7 per cent.? £621.
8. I lost 20 per cent. by selling a horse for £40; what did it cost me? £50.
9. Find the interest on £40 for a month at 4 per cent. 2s. 8d.
10. What must I charge for goods costing £30 to gain 12½ per cent.? £33 15s.
11. What is the simple interest on £15 for 2 years at 3½ per cent.? £1 1s.
12. Find the percentage of loss on an article bought for 6s. and sold for 5s. 4d. 11⅑ per cent.

Jeanne d'Arc, by Lamartine.

JEANNE D'ARC.	JOAN OF ARC.
	XXIV.
Les chefs, pressés de profiter	The chiefs, eager to take advantage
de cet enthousiasme,	of this enthusiasm,
ébranlèrent leurs troupes.	ordered their troops to advance.
Jeanne, consultée par eux,	Joan, (being) consulted by them,
voulait que, sans considération	desired that, without considering
du nombre et de l'assiette des Anglais,	the number and the position of the English,
on marchât droit à Orléans	they should march straight on Orleans
par la route la plus courte,	by the shortest route,
celle de la Beauce.	that through La Beaucé.
Les généraux feignirent d'y consentir,	The generals pretended to consent to it,
mais ils la trompèrent	but they deceived her,
pour le salut des troupes	for the safety of the troops,
et lui firent traverser la Loire	and caused her to cross the Loire
pour s'avancer à l'abri du fleuve	so as to advance protected by the river
par les bois et les marais de la Sologne.	through the woods and marshes of La Sologne.
Le chapelain de Jeanne marchait	Joan's chaplain marched
en tête de l'armée,	at the head of the army,
portant sa bannière	carrying her banner
et chantant des hymnes.	and singing hymns.
La marche ressemblait à une procession	The march resembled a (religious) procession
où le prêtre guide les soldats.	in which the priest leads soldiers.
Jeanne arriva le troisième jour	Joan arrived on the third day
en face d'Orléans.	opposite Orleans.
En voyant le fleuve	When she saw the river
entre elle et l'armée,	between her and the army,
elle s'indigna d'avoir été	she was angry at having been
trompée par les généraux.	deceived by the generals.
Elle voulait qu'on attaquât	She wished them to attack
sur l'heure les fortifications	at once the fortifications
des Anglais interposées	of the English placed
entre l'armée et la ville.	between the army and the town.
On endormit son impatience.	They lulled (soothed) her impatience.
* * * * * * *	
Le lendemain, ayant congédié l'armée	The following day, having dismissed the army
du roi qui n'avait pour mission que	of the King, whose sole duty it was
d'escorter le convoi jusqu'aux portes	to escort the convoy to the gates
et qui devait retourner défendre la plaine,	and to return to defend the plain,
Jeanne entra dans Orléans	Joan entered Orleans
à la tête de deux cents lances seulement;	at the head of 200 lances only;
elle était suivie	she was followed
du brave chevalier Lahire et de Dunois.	by the brave knight Lahire and de Dunois.
Montée sur une haquenée blanche,	Mounted on a white horse,
élevant son étendard	raising her banner
dans la main droite,	in her right hand,
revêtue de sa légère armure	clad in her white armour

qui étincelait aux yeux
d'un doux éclat, elle était à la fois,
pour les habitants de la ville
et pour les soldats, l'ange
de la guerre et de la paix.
Les prêtres, le peuple, les femmes,
les enfants, se précipitaient
sous les pieds de son cheval
pour toucher seulement ses éperons,
croyant qu'une vertu divine
émanait de cette envoyée de Dieu.
Elle se fit conduire à l'église,
où l'on chanta un *Te Deum*
de reconnaissance pour la ville secourue.
Mais le secours qui réconfortait
le plus le peuple était le secours surnaturel
qu'il croyait voir et posséder
dans la prophétesse.
Jeanne fut conduite de la cathédrale
dans la maison de la femme la mieux famée
de la ville pour que sa vertu fût
à l'abri des mauvais discours
et que sa bonne renommée restât
intacte au milieu des camps.
On lui avait préparé un festin.
Mais elle n'accepta qu'un peu
de pain et de vin, en humilité
et en mémoire de la table frugale
de son père.

which glittered
with a soft brightness, she became at once,
for the inhabitants of the town
and for the soldiers, the angel
of war and of peace.
Priests, people, women,
children, threw themselves
under the feet of her horse
just to touch her spurs,
believing that a divine virtue
emanated from this messenger of the Almighty.
She was conducted to the church,
where a *Te Deum* was sung,
in gratitude for the recovery of the town.
But the help which comforted
the people the most was the supernatural help
which they believed they saw and possessed
in the prophetess herself.
Joan was led from the cathedral
to the house of the most respectable woman
in the town, so that her virtue might be
protected against all slanders,
and that her good name might remain
unsullied in the midst of camps.
A feast had been prepared for her.
But she only accepted a little
bread and wine, in her humbleness (of heart)
and in remembrance of the frugal table
of her father.

XXVIII.

* * * * * * *

En vain les capitaines fermèrent-ils les portes
pour s'opposer le lendemain à son ardeur.
Le peuple et les soldats,
fanatisés d'amour et de foi pour elle,
se levèrent séditieusement contre eux
et menacèrent les généraux.
Les portes furent enfoncées
par la multitude, qui s'élança
comme un torrent
sur les pas de sa prophétesse.
Les chefs furent entraînés par les soldats.
Dunois, Gaucourt, Gonthaut, de Raiz,
Lahire, Xaintrailles, s'élancèrent à l'assaut
de la principale forteresse
qui restait aux Anglais.

In vain did the captains close the gates
to resist her impetuosity on the morrow.
The people and soldiers,
carried away by their love and faith in her,
rose in rebellion against them
and threatened the generals.
The gates were broken open
by the mob, which rushed
like a torrent
after (the footsteps of) the prophetess.
The generals were carried away by the soldiers.
Dunois, Gaucourt, Gonthaut, de Raiz,
Lahire, Xaintrailles, rushed to the assault
of the chief fortress
which still belonged to the English.

L'armée anglaise, entourée de remparts
et de fossés, foudroyait ces masses.
Les échelles, brisées à coups de hache,
se renversaient sur les assaillants.
Le pied des fortifications
était jonché de morts.
Le découragement saisissait la multitude ;
Jeanne seule s'obstinait à sa foi.
Elle saisit une échelle,
et, l'appliquant contre le mur du rempart,
elle y monte la première,
l'épée dans la main.
Une flèche lui traverse le cou
vers l'épaule ;
elle roule inanimée dans le fossé.
Les Anglais, pour qui Jeanne serait une victoire,
sortent des retranchements pour l'enlever.
Gamaches la couvre de sa hache
et de son corps.
Les Français reviennent
à sa voix et la délivrent.
Elle reprend ses sens
et voit Gamaches blessé
et vainqueur pour elle.
'Ah ! dit-elle en se repentant
de l'avoir une fois contristé,
prenez mon cheval, et sans rancune !
j'avais tort de mal penser de vous,
car jamais je ne vis
un plus généreux chevalier.
On emporta Jeanne à l'abri,
pour la désarmer
et pour visiter sa blessure.
La flèche sortait de deux largeurs de main
derrière l'épaule.
Le sang l'inondait.
Elle était femme et faible pourtant,
car elle pleura
en voyant son sang couler.
Puis elle se reconsola,
en priant
ses célestes protectrices dans le ciel.
Elle arracha ensuite la flèche
de sa propre main,
et répondit aux hommes d'armes
qui lui recommandaient
des remèdes superstitieux d'enchanteurs
et des paroles magiques
en usage alors dans les camps :
'J'aimerais mieux mourir
que de pécher ainsi

The English army, surrounded by ramparts
and ditches, overwhelmed these masses.
The ladders, broken by blows of the axe,
were hurled back on the besiegers.
The foot of the fortifications
were strewn with the dead.
Discouragement seized the multitude ;
Joan alone clung to her faith.
She seized a ladder,
and, placing it against the ramparts,
mounted it first,
sword in hand.
An arrow pierced her neck,
in the region of the shoulder;
she rolled inanimate into the moat.
The English, to whom (the possession of) Joan would be a victory
rush out of their entrenchments to carry her off.
Gamaches protects her with his axe
and his body.
The French return
at the sound of his voice and save her.
She regains her senses
and sees Gamache wounded
and victorious on her behalf.
'Ah !' she exclaimed, repenting
of having once grieved him,
'accept my horse, and without any ill-feeling !
I was wrong in thinking evil of you,
for never did I see
a more generous knight.'
They carried Joan away to a place of safety,
to take off her armour
and examine her wound.
The arrow stuck out two handbreadths
behind the shoulder.
She was bathed in blood.
She was however only a weak, feeble woman,
for she wept
when she saw her blood flowing.
Then she took comfort,
as she prayed to
her heavenly protectors.
She plucked out the arrow
with her own hand,
and replied to the men at arms
who recommended to her
the superstitious remedies of magicians
and magic words
used at that time in the camps :
'I should prefer to die
rather than sin thus

contre la volonté de Dieu.' against God's will.'
On pansa sa blessure avec de l'huile, They dressed her wound with oil,
et elle remonta à cheval and she remounted her horse
pour suivre à regret l'armée to follow with regret the army
et le peuple découragés, and the discouraged people,
qui se retiraient. who retreated.

XXIX.

Elle entra, pour prier, dans une grange. She entered a barn in order to pray.
Le cœur lui disait encore de combattre, Her heart still counselled her to fight,
mais elle n'osait tenter Dieu et résister à l'avis des capitaines. but she dared not tempt God and resist the advice of her captains.
Cependant sa bannière était restée dans le fossé, au pied de l'échelle d'où Jeanne venait d'être renversée. However, her banner still remained in the moat, at the foot of the ladder from which Joan had just been hurled.
Daulon, son chevalier, s'en étant aperçu, courut avec quelques hommes d'armes pour reprendre cette dépouille, qui aurait trop enorgueilli les Anglais. Daulon, her squire, having perceived this, rushed with a few men at arms to recover this trophy (spoil), which would have made the English too proud.
Jeanne y courut à cheval après eux. Joan galloped after them.
Au moment où Daulon remettait dans les mains de sa maîtresse l'étendard, ses plis, agités par le mouvement du cheval et par le vent, se déroulèrent au soleil At the moment when Daulon put into the hands of his mistress (Joan) the standard, its folds, shaken out by the movements of the horse and wind, were unfurled to the sun (breeze)
et parurent aux Français un signal que Jeanne leur faisait pour les rappeler à son secours. and seemed to the French a signal which Joan gave them to call them back to her aid.
Les Français, déjà en retraite, accoururent de nouveau pour sauver leur héroïne. The French, already in retreat, rushed back once more to save their heroine.
Les Anglais qui la croyaient morte, la revoyant à cheval à la tête des assaillants, la crurent ressuscitée ou invulnérable : la panique s'empara d'eux. The English who believed her dead, seeing her again on horseback at the head of the besiegers, thought she had come to life again, or invulnerable: a panic seized them.
Les illusions du feu des canons au milieu des fumées colorées de la poudre leur firent voir des esprits célestes, divinités tutélaires d'Orléans, à cheval dans les nuées, et combattant de l'épée de Dieu pour Jeanne et sa cause. The illusions of the firing of the cannons amidst the coloured smoke of the gunpowder made them see celestial spirits, the tutelary divinities of Orleans, riding in the clouds, and fighting with the sword of the Almighty for Joan and her cause.
Une poutre, jetée sur le fossé, servit de pont-levis à un intrépide chevalier A beam, thrown across the moat, served as a drawbridge to an intrepid knight
qui fraya le chemin des remparts à nos bataillons. who cleared the road to the ramparts for our battalions.
Le commandant anglais, Gladesdale, se repliant devant cette irruption, cherchait à traverser un second fossé pour s'enfermer dans le réduit. The English commander, Gladesdale, falling back before this irruption (attack), sought to cross a second moat to shut himself up in the inner fort.
'Rends-toi, Gladesdale ! lui cria Jeanne. 'Surrender, Gladesdale !' cried Joan.
Tu m'as vilainement injuriée, mais j'ai pitié de ton âme et de celle des tiens.' 'Thou hast insulted me shamefully, but I have pity on thy soul, and on those of thy people.'

* * * * * * *

XXXI.

Mais Jeanne ne perdit pas de temps à savourer de vains triomphes. But Joan did not lose time in enjoying empty triumphs.
Elle ramena l'armée victorieuse au Dauphin, pour l'aider à reconquérir ville à ville son empire. She led back the victorious army to the Dauphin, to help him to reconquer every town of his kingdom.
Le Dauphin et les reines la reçurent comme une envoyée de Dieu, qui leur apportait les clefs perdues et retrouvées de leur royaume. The Dauphin and the Queens received her as one sent from God, who brought to them the keys (hitherto) lost, but now found again, of their kingdom.
'Je n'ai qu'un an à durer, dit-elle avec une prescience triste qui semblait lui révéler son échafaud dans sa victoire ; il me faut donc vite employer.' 'I have only one year to live,' she said, with melancholy prescience which seemed to unveil to her the scaffold in the midst of her victories ; 'you must therefore let me do my work quickly.'
Elle conjura le Dauphin d'aller se faire couronner immédiatement à Reims, bien que cette ville et les provinces intermédiaires fussent encore au pouvoir des Bourguignons, des Flamands et des Anglais. She besought the Dauphin to go to be crowned immediately at Rheims, although this town and the intervening provinces were still in the power of the Burgundians, Flemish and English.
L'imprudence de ce conseil frappait les conseillers et les généraux de la cour. The imprudence of this advice deeply impressed the councillors and generals of the court.
Le sacre du roi à Reims était, aux yeux de tous, une impossibilité ou une témérité qui pour une vaine ombre de puissance, leur ferait abandonner les fruits de la victoire actuellement dans leurs mains. The coronation of the king at Rheims was, in the eyes of everyone, an impossibility or an act of rashness which, for the vain semblance of power, would cause them to give up the fruits of the victory now in their grasp.
On voulait reconquérir auparavant la Normandie et la capitale. They wished first to conquer Normandy and the capital.
Les conseils succédaient aux conseils. Councils succeeded councils.

Jeanne se consumait d'ennui	Joan was consumed with ennui
et d'inaction à la cour ;	and want of action at the court ;
ses inspirations l'obsédaient,	her inspirations beset her,
et à son tour elle obsédait humblement	and in her turn she humbly beset (importuned)
le Dauphin.	the Dauphin.

* * * * * * *

XXXIV.

* * * * * * *

Après une semaine d'inutile attente,	After a week of useless waiting,
Jeanne fit donner l'assaut aux remparts,	Joan ordered an assault on the ramparts,
du sommet de cette petite colline	from the top of that small hill
couverte aujourd'hui de rues,	now covered with streets,
d'édifices et de temples,	edifices and temples,
qui a gardé le nom	which has still preserved the name
de butte des Moulins.	of 'butte des moulins' (= windmill-hill).
Elle franchit, avec le duc d'Alençon	She cleared, with the Duke d'Alençon
et les généraux, le premier fossé	and the generals, the first trench
sous le feu de la ville.	under the fire of the town.
Parvenue au bord du second et exposée	Arrived at the edge of the second and exposed
presque seule aux traits des remparts,	almost alone to the arrows of the ramparts,
elle sondait la profondeur de l'eau	she sounded the depth of the water
et la vase du bout de sa lance	and the mud with the end of her lance,
et faisait combler le fossé	and had the trench filled up
de fascines par les soldats,	with fascines by the soldiers,
tout en agitant sa bannière	all the while waving her banner
et en criant à la ville rebelle de se rendre,	and calling to the rebel town to surrender,
quand une flèche lui traversa la jambe	when an arrow pierced her leg
et la jeta évanouie	and stretched her fainting
sur un monceau de morts et de blessés.	on a pile (heap) of dead and wounded.
On la transporta	They carried her
sur le revers de la berge du fossé	to the other side of the bank of the moat
où les flèches et les feux	where the arrows and shots
passaient par-dessus sa tête,	passed over her head,
et on l'étendit sur l'herbe	and they laid her down on the grass
pour arracher la flèche de sa blessure.	to draw the arrow out of the wound.
Elle retrouva la voix et les gestes	She recovered her voice and her gestures
pour encourager les siens à l'assaut.	to encourage her people to the assault.
Les vaillants chevaliers la suppliaient	Valiant knights entreated her
en vain de se laisser rapporter au camp,	in vain to allow herself to be carried to the camp,
les flèches et les boulets labouraient	the arrows and cannon balls ploughed up
en vain la terre autour d'elle,	in vain the ground near her,
les fossés se comblaient	the trenches were heaped up
en vain de cadavres :	in vain with corpses :
elle s'obstinait à la victoire ou à la mort.	she persisted in victory or death.

(To be continued.)

The Glass of Water; or, Cause and Effect.

(Comedy in Five Acts.)

LE VERRE D'EAU ; OU, LES EFFETS ET LES CAUSES.

(Comédie en Cinq Actes.)

Scène V.	Scene V.
Abigaïl, Bolingbroke.	Abigail, Bolingbroke.

* * * * * * *

Bolingbroke.

[*lui montrant la porte du fond qui s'ouvre.*	[*Showing her the door in the background opening.*
Avec mes honorables collègues que voici !...	Together with my honourable colleagues whom you see here—
les principaux membres de l'opposition.	the chief members of the Opposition.

Abigail.

Et pourquoi donc ?	And why I ask ?

Bolingbroke.

[*à demi-voix.*	[*lowering his voice.*
Outre l'héritage,	Besides the inheritance,
mon cousin laisse encore des espérances...	my brother leaves also hopes
celles d'une émeute dont sa mort sera peut-être la cause :	of a commotion, of which his death will be perhaps the cause.
c'est le premier service qu'il rend à notre parti...	It is the first service which he has rendered our party,
et jamais, à coup sûr,	and never, most assuredly,
il n'aura fait autant de bruit de son vivant.	will he have made so much stir in his lifetime.
Silence !...c'est la reine.	Hush ! the Queen.

Scène VI.	Scene VI.
Abigaïl, Bolingbroke, la Duchesse, la Reine.	Abigail, Bolingbroke, the Duchess, the Queen.

* * * * * * *

Bolingbroke.

Je ne doute point de leur réponse !...	I have no doubt as to their replies—
les places honorables qu'ils occupent	the honourable positions which they occupy
en sont un sûr garant.	are a sure guarantee for that.
Mais enfin ... si, comme madame la duchesse le prétend,	But if, as the Duchess pretends,
le véritable coupable est échappé,	the real culprit has escaped,
sans qu'on l'aperçût,	without it being noticed,
ce qui supposerait une grande connaisance	(a fact) which would imply an intimate acquaintance
des appartements et détours du palais,	with the apartments and windings of the palace,
comment se fait-il	how does it happen
qu'on n'ait pris aucune mesure	that they have not taken any measures
pour le découvrir ?	to discover the culprit ?

Abigail.

[*à part.*	[*aside.*
C'est fait de nous.	It is all over with us.

Bolingbroke.

Comment se fait-il que nous soyons obligés
de stimuler le zèle, d'ordinaire si actif,
de madame la surintendante, qui, par sa charge,
a l'entière surveillance et la haute main
dans la maison de la reine... comment les ordres les plus sévères ne sont-ils pas déjà donnés ?...

How does it happen that we are compelled
to stimulate the zeal, usually so active,
of your Majesty's superintendent, who, from her office,
has the whole management and full authority
in the Queen's household? Why have not the most stringent orders been already issued?

The Duchess.

Ils le sont ! — They are.

Abigail.

[*à part.* — [*aside.*

O ciel ! — O heaven !

The Duchess.

Sa Majesté vient de prescrire
les mesures les plus rigoureuses dans cette ordonnance...

Her Majesty has just prescribed
the most vigorous measures in this order.

The Queen.

Dont nous confions l'exécution à madame la duchesse
(*la remettant à Bolingbroke*),
et à vous, monsieur de Saint-Jean...
je veux dire milord Bolingbroke, à qui ce titre,
et les liens du sang
qui vous unissaient au défunt,
imposent plus qu'à tout autre le devoir
de poursuivre et de punir le coupable.

Whose execution we confide to the Duchess
(*handing the ordinance to Bolingbroke*)
and to you, Monsieur de St. Jean,
I mean my Lord Bolingbroke, on whom this title,
and the bonds of relationship
which united you to the defunct,
impose more than on any other the duty
of pursuing and punishing the guilty one.

The Duchess.

On ne dira plus, je l'espère,
que nous le protégeons
et que nous voulons le soustraire à votre vengeance.

People will no longer say, I hope,
that we shelter
and desire to protect him against your vengeance.

The Queen.

Milord et messieurs, êtes-vous satisfaits ?

My lord and gentlemen, are you satisfied?

Bolingbroke.

Toujours, quand on a vu Votre Majesté
et qu'on a pu s'en faire entendre.
(*La reine salue de la main Bolingbroke et ses collègues qui s'inclinent profondément, et rentre avec la duchesse et ses femmes dans ses appartements à droite.*
Le reste de la foule s'écoule par les portes du fond.)

Always, after beholding your Majesty.
(*The Queen salutes Bolingbroke and his colleagues with her hand; they bow profoundly. Exeunt the Queen, Duchess and Ladies on the right.*
The rest of the crowd disperse through the doors in the background.)

Scène VII. — Scene VII.

Bolingbroke, Abigail. — Bolingbroke, Abigail.

* * * * * * *

Bolingbroke.

[*poussant un cri.* — [*uttering an exclamation.*

J'y suis !...
l'homme à la chiquenaude ...
Oui, ma chère, une véritable chiquenaude...
c'est elle qui a été la cause de tout,
d'un duel, d'une émeute...
du superbe discours que je viens de prononcer...
et plus encore d'une ordonnance royale.

I know,
the man that snapped his fingers.
Yes, my dear, a real fillip.
That snap has been the cause of everything,
of a duel, a disturbance,
the superb discourse that I have just pronounced,
and more than all a royal command.

Abigail.

Qui vous prescrit de l'arrêter.

Which orders you to arrest him.

Bolingbroke.

[*vivement.* — [*quickly.*

L'arrêter !...Allons donc !
Celui à qui je dois tout, un rang, un titre
et des millions ! non...non...
je ne suis pas assez ingrat,
assez grand seigneur pour cela.
(*Prenant l'ordonnance qu'il veut déchirer.*)
Et plutôt morbleu !...(*S'arrêtant.*) O ciel !...
et tout un parti qui compte sur moi...
et l'opposition entière que j'ai déchaînée
contre ce malheureux duel...
et puis enfin aux yeux de tous...
c'est mon parent...c'est mon cousin...

Arrest him ! Nonsense !
(Arrest) him to whom I owe everything, rank, title,
and millions ! No, no,
I am not so ungrateful,
not great lord enough to do that.
(*Taking the order which he intends to tear to pieces.*)
Rather — zounds ! (*Stopping.*) Heaven
and our whole party count on me,
the entire Opposition that I have unchained
against this unhappy duel,
and then again, in the eyes of all,
he is my relative, my cousin.

* * * * * * *

Scène X. — Scene X.

Bolingbroke, la Duchesse. — Bolingbroke, the Duchess.

* * * * * * *

Bolingbroke.

Je ne vois pas cela !...
Je connais de hautes capacités politiques
qui mènent de front les amours et les affaires...
qui se délassent des préoccupations sérieuses
par de plus douces pensées
et sortent parfois des détours de la diplomatie
pour entrer dans de piquantes et mystérieuses intrigues.
Je connais entr'autres une grande dame,
que vous connaissez aussi, qui,
charmée de la jeunesse et de la naïveté
d'un petit gentilhomme de province,

I do not see that.
I know some (men of) high political capacities
which carry on at the same time love affairs
and state business; who find relief from serious business
in sweeter thoughts;
and quit sometimes the tortuous paths of diplomacy
to enter upon (enjoy) more lively and mysterious intrigues.
I know a great lady, among others,
whom you also know, who,
charmed with the youth and innocence
of a young nobleman from the provinces,

a trouvé bizarre et amusant
(je ne lui suppose pas d'autre intention)
de devenir sa protectrice invisible...
sa providence terrestre,
et sans jamais se nommer,
sans apparaître à ses yeux,
elle s'est chargée de son avancement et de sa fortune...
(*Geste de la duchesse.*) C'est intéressant,
n'est-ce pas, madame?...Eh bien!
ce n'est rien encore! Dernièrement,
et par son mari qui est un grand général,
elle a fait nommer son protégé
officier dans les gardes,
et, ce matin même, l'a prévenu
mystérieusement de son nouveau grade,
en lui en envoyant les insignes...
des ferrets en diamants que l'on dit magnifiques...

has found it whimsical and amusing
(I do not attribute to her any other intention)
to become his invisible protectress,
his earthly providence;
and without ever naming herself,
without appearing in his sight,
she has taken upon herself the care of his advancement and fortune.
(*The Duchess slightly starts*) It is interesting,
is it not, Duchess? Well,
that is nothing yet! Lately,
and through her husband who is a great General,
she has caused her protégé to be appointed an officer in the Guards,
and, this very morning, has informed him
mysteriously of his new rank
by sending him the insignia of it—
diamond tags which are said to be magnificent.

The Duchess.

[*avec embarras.*

Ce n'est guère vraisemblable...
et à moins que vous ne soyez bien sûr...

[*embarrassed.*

That is scarcely probable,
and unless you are very certain—

Bolingbroke.

Les voici...ainsi que la lettre qui les accompagnait.
(*A demi-voix.*) Vous comprenez qu'à nous deux...
car nous deux seulement connaissons ce secret,
nous pourrions perdre cette grande dame!
Des places ainsi données sont sujettes
aux contrôles des chambres et de l'opposition...
Vous me direz qu'il faut des preuves...
mais ce riche présent acheté par elle...
cette lettre, l'écriture qui, quoique déguisée,
pourrait aisément être reconnue,
tout cela donnerait lieu
à une effroyable publicité
que cette grande dame pourrait peut-être braver:
mais elle a un mari...
ce général dont je parlais...
un caractère violent et emporté,

Behold them, as well as the letter which accompanied them.
(*Changing his tone.*) You understand that between us—
for we two alone know this secret—
we could ruin this great lady!
Places thus given are subject
to the control of both Houses and of the Opposition.
You will tell me that proofs are necessary;
but this rich present bought by her,
this letter, the writing of which, though disguised,
might easily be recognised,
all this would give rise
to terrible publicity
which this great lady might perhaps face;
but she has a husband—
the General of whom I spoke—
a violent and hasty tempered man,
dont un pareil scandale exciterait la fureur...
car un grand homme, un héros tel que lui,
devait penser que les lauriers préservaient de la foudre...

whose fury such a scandal would rouse,
for a great man, a hero such as he is,
must think that laurels preserved from the thunderbolt—

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ACT III.

Scène II.

La Duchesse, la Reine, Abigaïl.

Scene II.

The Duchess, the Queen, Abigail.

* * * * * * *

The Duchess.

A la bonne heure!
Je vais annoncer au maréchal ce qui se passe,
et en même temps écrire,
pour le marquis de Torcy,
cette lettre que je soumettrai à l'approbation
et à la signature de Votre Majesté...

I am glad of your determination.
I now go to inform the Marshal what is taking place,
and at the same time write,
for the Marquis of Torcy,
that letter which I will submit to you for your approbation
and signature of your Majesty.

The Queen.

C'est bien!

That is well!

The Duchess.

Ici...à trois heures,
en venant la prendre pour aller à la chapelle!

Here, at three o'clock,
on coming to join your Majesty when going to chapel.

The Queen.

A merveille... je vous remercie!...

Very well; I thank you.

The Duchess.

[*à part.*

Enfin!

[*Elle sort.*

[*aside.*

At last!

[*Exit.*

Abigail.

(*qui pendant ce temps est toujours restée assise près du guéridon.*)
Pauvre marquis de Torcy... nous voilà bien!
(*Elle se lève et va replacer près de la porte du fond le tabouret qu'elle y avait pris.*)

(*who during this time was seated near the table.*)
Poor Marquis de Torcy! there we are in a fine predicament.
(*She rises and is going to put back near the door in the background the seat which she had taken there.*)

The Queen.

(*à gauche et prenant les dépêches que la duchesse lui a remises.*)
Ah! quel ennui!
Entendrai-je donc toujours parler de bill,
de parlement, de discussions politiques?...
et ces dépêches du maréchal...
qu'il me faut lire, comme si je comprenais
quelque chose à ces termes de guerre!
(*Elle parcourt le rapport.*)

(*on the left, taking the despatches which the Duchess had given her.*)
Oh! what trouble (ennui)!
Must I then always hear nothing else spoken of but bills,
parliament, political discussions?
and these despatches of the Marshal
which I must read, as if I understood
anything of these expressions of war!
(*She hastily glances at the report.*)

Scène V.	Scène V.
La Reine, Abigaïl, Bolingbroke, Masham.	The Queen, Abigail, Bolingbroke, Masham.
The Queen.	
Ah ! c'est toi, Abigail...	Oh, it's you, Abigail ?
plus tard je te parlerai.	I will speak with you by-and-bye.
Abigail.	
Eh ! non, madame, c'est sur-le-champ !	Oh no, your Majesty, it must be at once.
Un ami qui vous est dévoué...	A friend who is devoted to you
et qui me demande avec instance	entreats me
de la faire arriver jusqu'à Votre Majesté !	to bring him into the presence of your Majesty.
The Queen.	
[*avec humeur.*	[*testily.*
Toujours interrompue et dérangée...	Always interrupted and troubled !
pas un instant pour s'occuper d'affaires sérieuses !...	Not a moment to spare for serious business !
Que me veut-on ?...quelle est cette personne ?	What do they want with me ? Who is this person ?
Abigail.	
Lord Bolingbroke.	Lord Bolingbroke.
The Queen.	
[*avec effroi et se levant.*	[*rising up in fear.*
Bolingbroke !	Bolingbroke !
Abigail.	
Il s'agit, dit-il,	He says it is about
de la question la plus grave, la plus importante !	the gravest and most important matters.
The Queen.	
[*à part, avec impatience.*	[*aside, impatiently.*
Encore des réclamations,	Claims again,
des plaintes, des discussions...	complaints, discussions.
(*Haut.*) C'est impossible... la duchesse va venir.	(*Aloud.*) Impossible ; the Duchess is coming.
Abigail.	
Eh bien ! avant qu'elle revienne !	Yes, but before she returns !
The Queen.	
Je t'ai dit que je ne voulais plus être tourmentée,	I have told you I would not be tormented any longer,
ni entendre parler d'affaires d'État...	nor listen to affairs of the State.
D'ailleurs maintenant cette entrevue ne servirait à rien !	Besides now this interview will be of no use.
Abigail.	
Alors, voyez-le toujours,	Then see him all the same,
ne fût-ce que pour le congédier...	were it only to dismiss him,
car j'ai dit qu'on le laissât monter.	for I have told them to admit him.
The Queen.	
Et la duchesse que j'attends	And (what about) the Duchess whom I await
et qui va se rencontrer avec lui ?...	and who will meet him here ?
Qu'avez-vous fait ?	What have you done ?
Abigail.	
Punissez-moi, madame, car le voici !	Punish me, madam, for he is here !
The Queen.	
[*avec colère en traversant le théâtre.*	[*crossing the stage in anger.*
Laissez-nous !	Leave us !
Abigail.	
[*à Bolingbroke qu'elle rencontre au fond du théâtre et à voix basse.*	[*in a low voice to Bolingbroke whom she meets in the background.*
Elle est mal disposée !	She is ill-disposed (towards you).
Masham.	
[*de même.*	[*in a low voice.*
Et vous n'y pourrez rien !	And you will be able to do nothing here.
Bolingbroke.	
Qui sait ?...le talent...ou le hasard !...	Who knows ? tact, chance,
celui-là surtout !...	the former especially.
[*Abigaïl et Masham sortent.*	[*Exeunt Abigail and Masham.*

(To be continued.)

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music.

90. *Fe* is best taught by pattern from **soh**. The explanation of the fact that it is a convenient way of naming the **te** of brief changes of key can be left until the class is sufficiently familiar with the effect. But the likeness of **s fe s** to **d t, d** should be immediately pointed out. When the phrase **s fe s** is easily imitated it should be at once contrasted with **s f m** and attention should be drawn to the fact that **f** sounds graver than ever after the ear is filled with the bright cheerful effect of **fe**. The class should now try to sing **s f m** after the teacher sings **s fe s**, or **s fe s** after the teacher sings **s f m**. Then individuals should be asked to sing **s fe s** and **s f m** alternately, and ear exercises on the two little phrases should follow. Next the class should be asked to sing **s fe s** after any other group of scale tones the teacher may sing, thus :—

Teacher sings.	Children respond.
d s m f m	**s fe s**
d m s l s	**s fe s**
d' s l f m	**s fe s**
m r d f m	**s fe s**

The class will now be able to follow on the modulator such voluntaries as the following :—

Specimen Exercises on **fe**.

In low or medium keys.

(1) **d s m d s l s s fe s s f m r d**
(2) **d m r d s f m s fe s l s f f m**
(3) **s m d r m f s m s fe s f m r r d**
(4) **m r d s d' t l s s fe s l s f r d**
(5) **d r m d s f l s s fe s f m r d**
(6) **m s d r m s fe s l s f m f r d**

More difficult exercises should be left until a later stage.

91. *Ta* should be introduced much in the same way as **fe**. It should be patterned in the phrase **d' ta l**, the grave '**fah**' like effect of the **ta** pointed out, and the likeness of the phrase to **s f m** of another key shown. When the phrase can be imitated it should be immediately contrasted with **l t d'** and the additional brightness that **t** gains by comparison with **ta** should be forcibly illustrated. Then the class should sing **d' ta l** after the teacher sings **l t d'** and *vice versa*, and individuals should also in turn sing the same phrases alternately. It will be found much more difficult to establish **d' ta l** in the ear than **s fe s**. The lesson on **d' ta l** will have to be repeated many times before the attack will be firm and sure. Such modulator exercises as the following will perhaps now be practicable. If a mistake is made the teacher should pattern the correction *to* the class and not sing with the pupils.

Specimen Exercises on **ta**.

In a low key.

(1) **d s f m s d' d' ta l l t d' d m r d**
(2) **m d s m d' ta l t d' s m d r m d**
(3) **d r m s d' ta l t d' s f l s m r m d**
(4) **d d' t d' d' ta l l s l t d' m r d**
(5) **s m s d' t d' ta l s l t d' d s t_1 d**
(6) **m r d m s l t d' d' ta l t d' s d**

Nos. 4 and 5 introduce **s** after **d' ta l**. This succession will require a pattern and special practice. For the present it would be unwise to practice *leaps* to or from **ta** or any succession that does not introduce **t** soon after **ta**.

92. When practising in keys above E or F the **ta** just below **d'** is too high for average voices. The **ta** below middle **d** (**ta_1**) should therefore be practised. Although the mental effect of low **ta** is but as it were a deeper shade of the same colour as the **ta** above, it will be found necessary to go through all the processes of patterning and contrasting described above. No practice of **ta** at this stage should be reckoned complete unless the **ta** below **d** is included.

Specimen Exercises on low **ta** (**ta_1**).

Key F or G.

(1) **d r m d t_1 d d ta_1 l_1 t_1 d**
(2) **d m r d d ta_1 l_1 t_1 d r d**
(3) **d s_1 l_1 s_1 t_1 d ta_1 l_1 t_1 d s_1 l_1 t_1 d**
(4) **d m d s_1 d ta_1 l_1 l_1 s_1 l_1 t_1 d t_1 r d**
(5) **m r d s_1 d t_1 d l_1 l_1 t_1 d d ta_1 l_1 t_1 d**
(6) **d s_1 d r d ta_1 ta_1 l_1 t_1 d r t_1 d s_1 t_1 d**

93. The requirements now for the first time ask for proof of power to sing from a written or printed tune exercise. But the previous teaching in other standards must have been miserably inadequate if horizontal exercises in tune are new to the standards in Division III. In this Division the teacher should have only to revise and perfect previous practice of such work. For the purpose of accustoming the eye to the horizontal notation, the modulator may be written on the board, thus :—

d' r' m' f'
d r m f s l t
m_1 f_1 s_1 l_1 t_1

the three different levels showing three octaves and drawing forcible attention to the octave marks. By pointing voluntaries upon this form of modulator the rise and fall of the tones can be grasped without much effort. Another exercise that promotes observation is to get pupils to *draw* the shape of a phrase by curves or oblique lines.

Thus :—

d t_1 l s r m

might be roughly shown by—

Again to enforce attention to octave marks pupils should point on the modulator phrases like the following, which should be written on the blackboard.

(1) **d l m d' t_1 l s_1 m**
(2) **s r' d t_1 m' f s_1 d'**

94. It will have been observed that the terms of the printed test are the same as those of the modulator test for Division II. That is, any leap in the Doh chord may be used, and the other tones are to be approached and quitted stepwise. The tests given in section 35 will consequently suffice. The twelve tests there given can be made into twelve fresh tests by performing them backwards.

DIVISION III.—STANDARDS III. AND IV.

Code Requirement.

Time Test.—To sing on one sound to the syllable '*laa*' an exercise in three-pulse or four-pulse measure, containing one-pulse notes, half-pulse notes, and whole pulse rests on the non-accented pulses of the measure.

Examples :—

1 :1	1 :1	1 :1.1	1 :1	1 :1	1 : }
1 :	1 :	1 :1.1	1 :1	1 :	1 :1 }
1 :–	– :– ‖				
1 :– :1	1 :1 :1	1 :1.1 :1	1 :– :– }		
1 : :	1 : :1	1 : :1	1 :– :– ‖		

95. Four-pulse measure and half-pulse notes have already been dealt with in sections 47 and 53 to 58. The teaching of three-pulse measure and of whole pulse rests has yet to be described.

96. Three-pulse measure is easily taught by contrast with two-pulse measure, say in the following manner. The teacher taps several two-pulse measures (strong, weak, etc.). He then asks the class to listen whether he does the same again or something different. To sharpen curiosity, he taps the same measure again and again, and at last he taps strong, weak, weak, and invites a description of the difference. He then asks pupils to clap in sets of twos or threes until they can do so quite easily. Then with his voice he *laas* now one measure and now the other, and gets the class to do the same. The notation may now be taught, and the term 'three-pulse measure' made familiar. To train the eye to tell the measures from one another, the teacher should write a number of 'skeleton' measures on the board, and get pupils to come forward to draw curves from and to strong accent marks, and to name the measure thus shown—

Exercises in simple tune and time may now follow.

Specimen Easy Exercises written in Three-pulse Measure.

(1) Doh is D.

d :d :r	m :– :–	m :m :f	s :– :– }
s :s :f	m :s :d'	t :l :t_1	d' :– :– ‖

(2) Doh is D or E.

m :m :r	d :m :s	l :— :—	s :— :—
s :f :m	m :r :d	d :t_1 :d	r :— :—
r :m :f	m :f :s	l :t :l	l :s :s
d^1 :s :f	m :f :s	l :s :t_1	d :— :—

With half pulses.

(3) Doh is D.

m :m.r:d	r :m :f	s :s.f:m	r :m :s
d^1 :d^1.t:l	s :m :s	d :d.r:m	r :— :—
m :m.r:d	r :m :f	s :d^1.t:d^1	t :l :—
l :s.f:m	s :f :m	m :r.d:r	d :— :—

Range s_1 to l.

(4) Doh is F.

s_1 :l_1 :t_1	l_1 :s_1 :—	d :r :d	t_1 :l_1 :s_1
m :r :d	t_1 :l_1 :t_1	r :d :l_1	l_1 :s_1 :—
s :f :m	m :r :d	l :s :f	m :r :—
s :f :m	r :d :r	m :m :r	d :— :—

Some of the leaps in the above are beyond the 'written or printed' *sight singing* requirements of the Code for this Division. But these exercises are studies, not sight singing tests.

(To be continued.)

Our Certificate Class.

BY DR. GEORGE BEACH, M.A.

Head Master of Christ Church School, Macclesfield.

MUSIC.

A paper on this subject is not given to any *Student* about to leave the Training College, who has not passed the Musical Inspector's examination in practical skill. *Acting-Teachers* who take this paper must produce a certificate from some competent person (such as the organist of their church) that they have such an amount of musical skill, vocal or instrumental, as is sufficient for the purpose of teaching children to sing from notes.

The candidate has the option of the Staff or Tonic sol-fa Notation, but must not answer questions in both. A choice of nine questions out of twelve has been afforded for the last ten years, and the paper is distinctly the easiest of the series.

With respect to the merits of the rival notations, much unnecessary controversy has taken place. The T. S.-F. has the great advantage (at any rate in its initial stages) of simplicity. Its modulator depicts more graphically the varying distances between the different notes. It demonstrates very lucidly the tetrachords, and key and mode relationship. It pictorially represents time and accent, and gives a general formula of any musical passages expressed by its methods. From this point of view, the relationship of the T. S.-F. to the Staff Notation resembles very greatly that between Algebra and Euclid.

Yet the T. S.-F. is but the handmaid of its elder sister, which it can never supplant for difficult modulations, or passages in full instrumental harmony.

The S. N. gains in facility of execution by expressing the passage in one particular key; its staff represents the different pitch of the notes, better than the horizontally written T. S.-F., though worse than the vertical modulator. Its time notation is however arbitrary to a great extent whilst the duration of notes and rests are differently denoted.

The preponderance of advantages in commencing vocal music, especially with the young, undoubtedly remains with the T. S.-F.; and its propagandists have in addition much improved the methods of musical instruction, and have demonstrated the paramount importance of early ear-training.

The examination questions are where possible exactly the same for both Notations; and their order follows the main and generally even the detailed arrangement of the Syllabus. Under the head 'NOTES' the most numerous interrogations appear, no portion of the Syllabus is left untested and two general questions are often propounded.

No harmony has been required since 1886.

NOTES.—The student will be required (*a*) to re-write passage given in one staff an octave (or octaves) higher or lower in the other staff; (*b*) to write down the different forms of the Minor modes—to understand the relation of the Minor to the Major—to place a given phrase in a specified key and mode by inserting sharps, flats, or naturals; (*c*) to name the various intervals with their inversions (the pluperfect or augmented fourth or tritone and the minor third being the favourites); (*d*) to transpose a tune from one key to another; (*e*) and to state the key, the signature being given, and the signature, the key being given.

It should be noted that if a tune be raised one note in pitch, two more sharps or two less flats are required, and if lowered one note, two more flats or two less sharps are necessary.

Tonic sol-faists must understand (a) *the characteristics of notes;* (b) *minor phrasing corresponding to* (*or the shadow of*) *the major;* (c) *the names of the chromatic notes;* (d) *the removes of keys, the imperfect method, the distinguishing note of new key, the first, second, etc., sharp or flat keys;* (e) *and be able by means of chromatic names to transpose a tune without altering the pitch of the nominal tonic, which will be another note than DOH.*

TIME.—(*a*) The time value of various notes and rests is asked for, and fragments of bars and passages requiring completion are given; (*b*) a list of the various time-signatures should be prepared, and the time signature understood even when not inserted at the commencement; (*c*) syncopation and accent must be thoroughly mastered; (*d*) and transcription from one time to another kindred time be practised.

The remarks on TIME *apply mutatis mutandis to the requirements from Mr. Curwen's disciples.*

MUSICAL TERMS.—(*a*) All in ordinary use should be known, such as *forte, presto, dolce, da capo, dal segno, ad libitum, fortissimo, prestissimo, legato, a tempo, piu forte;* (*b*) and the equivalents of English phrases and words, *e.g., gradually slower, very fast, short and detached, soft, etc.* An acquaintance with Metronomic signs is requisite.

THE VOICE AND ITS TRAINING.—The Examinee must be prepared (*a*) to give the range of alto, tenor, treble, and bass voices, and the extent of boys' and girls' voices at different ages; (*b*) to describe a good voice exercise conducive to quality and sweetness, to enumerate the causes of flat singing, to discuss the question of occasional and long versus short and frequent practice, to mention the best vowels to use in training children's voices, and to explain the best means of developing the upper and lower registers.

GENERAL QUESTIONS.—1. Write out the time and tune of 'God save the Queen.'

2. Under what heads would you give marks in adjudicating at a school choir competition?

3. Draw up a series of tests for the various musical divisions of an Elementary school.

4. What are the ordinary defects of children's singing?

5. If treble and bass voices sing the same passage, will they sing at the same pitch?

6. In what scale or mode is there an interval of more than a tone between two consecutive notes?

LANGUAGE.

The Syllabus for Males mentions four languages, Latin, Greek, French and German, to which may be added Political Economy. From these five subjects any one or two (but not more) may be selected by the candidate.

By Females, but one language may be taken, and their choice is restricted to Latin, French and German.

Only those teachers who have creditably passed the First Year's papers in Geography, History, Arithmetic, Algebra, Mensuration and Geometry will be allowed to be examined in languages, and students in training are not allowed an individual choice, but may only take those languages for which a special course of instruction is provided in the Time-table of their College.

Two books in each language are prescribed, viz. :—

Latin.—(1) Cæsar, Gallic War, Book VII. or (1) *Sallust's Cataline*, and (2) Odes of Horace, Books III. and IV.

Greek.—(1) Xenophon's Cyropædia, Book I., and (2) Euripides' Andromache.

French.—(1) Lamartine's Jeanne d'Arc, and (2) Scribe's L^e Verre d'Eau.

German.—(1) Schiller's Thirty Years' War, and (2) Goethe's Hermann and Dorothea.

Political Economy has been fully treated of in our last lucubration.

The papers will contain fairly difficult passages for translation from and into English prose, together with questions upon constructions, idioms, and ordinary grammar.

Our space will not permit us to review each book, or to advise the candidate in detail, but this is rendered less necessary through Mr. Bower's French translations published in this periodical, the initiation of Hughes' French and German Journal, and the Model Answers to the last Certificate Questions, which all our readers should be familiar with.

The remarks on pp. 162—3 in Gladman's School Management, on the self-teaching of Latin are most excellent, and are generally applicable to the study of Aryan languages.

This month the Routines are discontinued. With respect to covering the area of study by three hours' daily work, our promises have been fulfilled, and our calculations verified. Moreover, ample time for revision has already been afforded, and yet six weeks remain before the advent of the fateful test. The inquisitorial mind, too, has been tracked to its lair, its windings have been painfully followed, probably questions have been suggested, a detailed and even lengthy analysis and syllabus of every subject provided, and the scope, nature, and tendency of each fully commented upon. We earnestly ask our students (with many of whom we have come into personal contact) to increase their efforts as the Examination looms larger, to revise, re-revise, and revise yet again, to study the Model Answers furnished by 'THE PRACTICAL TEACHER,' and to apply to themselves as many tests as possible, in order to discover whether the knowledge acquired and the processes learnt are easily reproduced and thoroughly understood.

It is true that History repeats itself, it is equally correct (as all 'Coaches' know) that examination questions perpetually recur.

This being so, we advise :

1st, a thorough revision of all subjects (*a*) From the Text Books; (*b*) In the order of our Analyses.

2nd, Frequent practice, on paper, of examination answering, special attention being paid to the time and space occupied.

Of course in revising, the dry facts and figures require most attention. Mental processes, rational inferences, and ideas (as distinguished from facts) being most easily retained and disinterred by the logical mind. With regard to this, however, the reader should study his own idiosyncrasy, and fortify his vulnerable points.

The weakest parts (perhaps unavoidably) of our Routines relate to Dates, Lives of Eminent Men, Social condition of the People, Music, and the Essays. The knowledge of these should be strengthened, and the text of the book set for English frequently perused. We give test papers on the various subjects, the questions where possible being identical with those previously given, and in other cases moulded in the same matrix.

SCHOOL MANAGEMENT.

MALES AND FEMALES.

N.B.—Question I. *must not be omitted by any Candidate.* Not more than EIGHT questions may be answered.

(*Three hours allowed for this Paper.*)

I. Give rules (*a*) For finding the annual and weekly average; (*b*) With regard to removing a scholar's name from the register; (*c*) With respect to qualification of a scholar for entry on the Examination Schedule; and (*d*) For keeping the Admission Register.

II. A school in Birmingham has an average of 250 scholars. What teaching staff should be provided? How would you distribute it? What time per week should be devoted to (*a*) The three R's; (*b*) Class Subjects; (*c*) Other Subjects?

III. Give a specimen of the sort of Black-board sketch which would be suitable for a lesson on (1) The Adjective; (2) Lakes, or (3) Our Parliament. What practical use would you make of this sketch?

IV. Criticise Pestalozzi's methods of teaching (*a*) Language, and (*b*) Number. Discuss his saying 'The circle of knowledge begins close round a man, and thence stretches out concentrically.'

V. In teaching Reading, some teachers thoroughly master a lesson before proceeding to another; others pass on more quickly, but read through the book oftener. Which method do you prefer and why?

VI. Enumerate the ordinary methods of reasoning. Which of these appeals most strongly to the juvenile mind? What fallacies are children most liable to?

VII. What do you mean by the 'converse' of a proposition? Give some examples. Are there any cases where the 'converse' is necessarily true?

VIII. Explain each of these technical terms, and give an illustration of its use :—Hypothesis, Data, Sequence, Intension, and Induction.

IX. How did Pestalozzi's principles and practice differ? What were his views on Religious Education?

X. What are the conditions on which the healthiness of school premises depends? Within what limits can the teacher affect these?

XI. By what indirect means may the formation of good principles and habits be promoted among your scholars? What are the indications of good *tone* in a school?

XII. In what ways may children be punished for irregularity, untidiness, and inattention? Name some objectionable methods of punishments, giving reasons for your opinions.

XIII. What books on the philosophy of education do you intend to read, to supplement your certificate course, and render you more efficient as a teacher?

XIV. How do you purpose to train your Pupil-Teachers in the art of teaching, and what lessons do you consider most suitable for that purpose?

ALGEBRA, MENSURATION, & ARITHMETIC.

MALES.

(*Three hours allowed for this paper.*)

'Candidates are not permitted to answer more than NINE questions in Algebra, and TWO in Mensuration (or Arithmetic). The SOLUTION must be given at such length as to be intelligible to the examiner, otherwise the answer will be considered of no value.' (See answers to Correspondents.)

Algebra.—I. The geometrical mean of two numbers is also the geometrical mean between the arithmetical mean of the two numbers and their harmonical mean.

The harmonic mean between two quantities is $\frac{4}{5}$ of the geometric, and the arithmetical mean is 5. Find the quantities.

II. Simplify (*a*) $\dfrac{(2+\sqrt{3})^{\frac{1}{2}} + (2-\sqrt{3})^{\frac{1}{2}}}{\sqrt{6}}$

(*b*) $\dfrac{x+a+\sqrt{x^2-a^2}}{x+a-\sqrt{x^2-a^2}}$

III. If x have to y the duplicate ratio of $x+z$ to $y+z$, prove that z is a mean proportional between x and y.

If one quantity vary directly as another, and the former be $\frac{3}{4}$ when the latter is $\frac{1}{2}$, find what the latter will be when the former is 9.

IV. How many permutations can be made out of the letters of the word 'reverts'?

V. The number of combinations of n things taken 3 together is 24 times as great as that of the number of combinations of $\frac{n}{2}$ things taken 4 together; find n.

VI. If the sixth, seventh, and eighth terms of $(a+b)^m$ be 112, 7, and $\frac{1}{4}$, find a, b, and m.

VII. Show that in the common system of logarithms, the characteristic of the logarithm of any number can be determined by inspection.

Given log. 8 = ·9030900, log. 9 = ·954245, find logs. of $1\frac{1}{8}$, $\sqrt{\frac{8}{9}}$, $\sqrt[3]{1\frac{1}{3}}$.

VIII. A person borrows a sum of money, and pays off at the end of each year as much of the principal as he pays interest for that year. Find how much he owes at the end of n years.

IX. Solve the equations (a) $\sqrt{x} + \sqrt{y} = 4$

$$(b)\ (a\sqrt{x} + b)(b\sqrt{x} + a) = ab\sqrt{x}\left(\sqrt[4]{x} + \frac{c}{\sqrt[4]{x}}\right)^2$$

X. A benevolent assembly gave away a certain sum of money. Had there been five persons more, and each had bestowed an additional shilling, the donation would have amounted to £6. Had there been three persons less, and each had bestowed eight pence less, the donation would have been diminished by 68 shillings. How many persons were there and what did each give?

XI. A man bought a number of fishing boats for £2,000. Some of these were then wrecked, but their insurance covered the loss except 10 per cent., which was £10 per boat. The remainder foundered at sea, but their insurance realised 20 per cent. gain. The total gain on all the boats was £100. How many boats were there at first, and how many were wrecked?

Mensuration.—($\pi = 3\frac{1}{7}$).

I. Find the ratio of the area of an equilateral triangle inscribed in a circle to that of the inscribed regular hexagon.

II. Find the height of a cylinder whose lateral surface is equal to double the surface of the base, and having a diameter of 10 ft.

III. Find the radius of a sphere which has the same volume as a cone, whose height $= h$, and radius of base $= r$.

Arithmetic.—I. If 14 ozs. of amalgam formed of 21 parts of gold and 3 parts of silver be worth 27 ozs. of amalgam formed of 10 parts of gold and 14 parts of silver, what is the relative value of gold and silver?

II. A, B, C, and D, whose rates of running are respectively $6\frac{1}{2}$, $7\frac{1}{2}$, $8\frac{1}{2}$, and 9 miles per hour, start at intervals of 6 minutes to run a course of 6 miles. Find which will arrive first, and the interval between his arrival and that of each of the other three.

III. A man leaves $\frac{1}{2}$ of his property to each of his three daughters, $\frac{1}{8}$ to each of two sons, and the remainder in legacies. He wished each son to receive £360 more than each daughter, but through miscalculation the difference was only £270. How much were the legacies, and how much had they lost by the miscalculation?

ARITHMETIC.

FEMALES.

Two hours and a half allowed for this Paper.

No candidate is permitted to answer more than TEN *questions.*

(*See also Directions to Male Candidates.*)

I. Explain the method of proving a simple multiplication sum by 'casting out the nines.'

II. Convert into their equivalent vulgar fractions $\cdot\dot{1}4285\dot{7}$ and $\cdot 04\dot{9}$. Prove by an example (using letters if possible) the rule for turning a 'Mixed Repeater' into a vulgar fraction.

III. Divide 1 by $\frac{1}{2}$, by $\frac{1}{100}$, by $\frac{1}{10^{100}}$. What is the magnitude of unity divided by zero? Deduce your answer from a comparison of the three results of the first portion of this question.

IV. A is distant from B 164 miles 20 poles. A train running 40 miles per hour travels from A to B, another with a speed of 30 miles per hour journeys from B to A. How far from A will they meet?

V. A time-piece started at twelve o'clock loses at the rate of 4 per cent. What is the real time when the hands are next together?

VI. What practical use is square root? Extract the square root, without reducing to vulgar fractions, of ·49, ·5, and ·7886 to four places of decimals.

VII. A, B and C start together to walk round a circular course 280 yards in circumference; the rates of walking are 4, 5, 6 miles respectively per hour. After what time will they all be together at the starting point, and how many rounds will each then have made?

VIII. A piece of wire was cut into two lengths, which bore the relation to one another of $\frac{3}{4}$ to $\frac{4}{5}$, and the difference in their lengths was 1 inch. What was the length of the wire?

IX. A legacy is to be divided among 17 persons, 16 of them receiving £45 10s. apiece, and the seventeenth the remainder, amounting to $\frac{1}{11}$ of the whole. What does he receive?

X. £1,000,000 is lent for two years at 5 per cent. compound interest. What difference in the total interest will it make if it were paid half-yearly instead of annually?

XI. Explain the rule for calculating discount. I promise to give a farmer two years from to day a flock of sheep numbering 686. If sheep increase their number 40 per cent. per annum, how many must I give him now to fulfil my promise? N.B.—Expense of their keep not to be reckoned.

XII. I bought 60 horses and 23 cows for £2,214; 10 horses and 8 cows died, and the remainder were sold for 5 per cent. profit, but realised altogether £355 10s. less than the original cost of all the beasts. What was the original price per cow?

XIII. What sum will amount to £3,515 4s. in three years at 4 per cent. compound interest?

XIV. Explain what is meant by stock, premium, par, and brokerage. A man buys Consols at a certain rate, and pays upon his dividend an income tax of 6d. in the £. The investment realises $2\frac{1}{2}$ per cent. net. At what premium was the stock?

XV. By investing in the Three-and-a-Half per Cents. at 98, I have an income of £120. How much money did I invest?

EUCLID.

(*Three hours allowed for this paper.*)

Not more than EIGHT questions may be answered. Candidates are reminded that correct solutions of the deductions obtain high marks. Capital letters (excluding A, B, C, D, E, F), not numbers, must be used in the diagrams. The only signs allowed are + and =.

The square on PQ may be written 'sq. on PQ,' and the rectangle contained by PQ and RS, 'rect. PQ, RS.' Other abbreviations, if employed, must not be ambiguous.

I. If two triangles have two sides of the one equal respectively to sides of the other, and their 'included' angles equal, their third sides will be equal.

Draw a diagram showing that this theorem is not necessarily correct if the equal angles are not the 'included' ones.

II. All the exterior angles of any rectilineal figure are together equal to four right angles. What limitation is necessary to the truth of this theorem?

III. Describe a square that shall be equal to a given rectangle.

If in any right angled triangle a perpendicular be dropped from the right angle to the hypotenuse, the square on the perpendicular shall be equal to the rectangle contained by the segments of the base.

IV. Two circles cannot touch each other externally at more points than one.

Prove this theorem also by Euclid III. 12, and Axiom 10.

V. From a point without a given circle, to draw a tangent to the given circle.

Two circles are concentric. If two chords of the exterior circle be tangents of the interior circle, these chords are equal.

VI. The opposite angles of any quadrilateral figure inscribed in a circle are together equal to two right angles.

What is the converse of this theorem? Prove that only equiangular parallelograms can be inscribed in circles.

VII. If from any point without a circle there be drawn two straight lines, one of which cuts the circle, and the othes meets it, and if the rectangle contained by the whole line which cuts the circle, and the part of it without the circle, be equal to the square on the line which meets the circle, the line which meets the circle shall touch it.

Describe a circle which shall pass through two given points and touch a given circle.

VIII. To describe a circle about a given triangle.

If the straight line joining the centres of the inscribed and circumscribed circles of a triangle pass through one of its angular points, the triangle is isosceles.

IX. To describe an equilateral and equiangular pentagon in a given circle.

If one of the interior angles of a regular pentagon be trisected, the two trisectors will be parallel to two sides of the polygon.

X. If the vertical angle of a triangle be bisected by a straight line which also cuts the base, the segments of the base shall have the same ratio which the other sides of the triangle have to one another.

If in any triangle a segment of the base equal to the adjacent side be taken, the line joining the vertex to the point of section divides the vertical angle into two unequal parts.

XI. Give Euclid's definition of ratio. Explain the phrase homologous sides.

A square is inscribed in a right angled triangle ABC, one side DE of the square coinciding with the hypotenuse AB of the triangle. Show that the area of the square is equal to the rectangle AD, BE.

XII. The sum of the squares upon lines drawn from a fixed point to the extremities of any diameter of a fixed circle is invariable.

DOMESTIC ECONOMY.

(*Three hours allowed for this paper.*)

No candidate is allowed to answer more than EIGHT questions.

I. 'Food is required for two purposes—the supply of solid waste, and the production of heat.' Describe a few of the typical (theoretically perfect) diets, stating the constituents of the articles which meet these requirements.

II. Describe, with exact statements of time, quantity and apparent waste in cooking, the processes of roasting, boiling, and stewing any piece of mutton.

III. Write out receipts for poaching an egg, frying a sole, boiling new potatoes, and making a plum cake.

IV. How would you make for invalids—a refreshing beverage, a light pudding, or meat soup?

V. State fully the qualifications of a good sick nurse.

VI. Explain any simple remedies which a teacher may resort to in the cases of—a severe bruise, a deep cut, a burn, a scald, an attack of fainting, and bleeding at the nose.

VII. In case of epidemics what disinfectants are the most efficacious? What rules should you adopt in case of any infectious illness breaking out in your dwelling-house?

VIII. Describe the system adopted for the investment of money in any land or building society. What are Government Annuities? Discuss the comparative advantages of the 'above' investments.

IX. Draw out Notes of Lessons to a first class on the principles, working, and advantages of Co-operative Stores.

X. Describe any good kitchen range with which you are acquainted, and explain its advantages under the heads of economy of fuel, cleanliness, improved cooking and safety.

XI. Draw up an account of a week's (five days) penny dinners for 200 poor school children, with details of cost and general arrangements.

XII. What are the particular points to be considered in selecting your dwelling-house? Give reasons.

GRAMMAR AND COMPOSITION.

FEMALES.

(*Three hours allowed for this paper.*)

No candidate must omit Questions 1 and 2, or answer more than *six other* questions.

Composition.—I. Write in plain language an essay on one of the following :—

(*a*) Any celebrated exhibition, such as the Manchester or Glasgow one.
(*b*) The character of Cassius.
(*c*) The influence of railways on prices.
(*d*) 'Knowledge is proud that he has learned so much ;
Wisdom is humble that he knows no more.'

Grammar.—II. Paraphrase *one* of the following passages, and explain fully the connexion in which it stands :—

(*a*) I could be well moved, if I were as you ;
If I could pray to move, prayers would move me.
But I am constant as the northern star,
Of whose true-fix'd and resting quality
There is no fellow in the firmament.
The skies are painted with unnumbered sparks,
They are all fire and every one doth shine,
But there's but one in all doth hold his place.
So in the world : 'tis furnished well with men,
And men are flesh and blood and apprehensive ;
Yet in the number I do know but one
That unassailable holds on his rank,
Unshaked of motion :

(*b*) I must prevent thee, Cimber,
These couchings and these lowly courtesies
Might fire the blood of ordinary men,
And turn pre-ordinance and first decree
Into the law of children. Be not fond,
To think that Cæsar bears such rebel blood
That will be thawed from the true quality
With that which melteth fools—I mean sweet words,
Low crooked court'sies and base spaniel-fawning.
Thy brother by decree is banished !
If thou dost bend and pray and fawn for him,
I spurn thee like a cur out of my way.

III. Say in what sense Shakespere used the following words, and give in each case the derivation :—

Indifferently, temper, marry ! factious, conceited, physical, fond, apprehensive, bootless, pricked.

IV. Analyse the passage—

'I have as much of this in art as you,
But yet my nature could not bear it so.'

V. Comment on the grammar of the following passages, and parse the words printed in italics :—

(*a*) *Shall* we on ? (*b*) The noble Brutus *is ascended.* (*c*) This was the *most unkindest* cut of all. (*d*) But one in all doth hold *his* place. (*e*) You are much condemned *to have* an itching palm.

VI. Take any of these characters—Portia, Lepidus, Casca; and say what part he (or she) plays in the drama, illustrating your answer by quotations.

VII. 'It was due, above all, to the great satirist, who alone knew how to use ridicule without abusing it; who, without inflicting a wound, effected a great social reform ; and who reconciled wit and virtue, after a long and disastrous separation, during which wit had been led astray by profligacy and virtue by fanaticism.' Comment on the various assertions of the above passage. How does it illustrate Macaulay's style?

VIII. In what group of Shakespere's plays is 'Cæsar' to be placed? When was it written, and what plays of Shakespere's most resemble it?

IX. Can you recall any words, phrases, or grammatical forms used in this play, but which are now obsolete?

X. Continue for another line, three of the following passages :—

(*a*) Where beggars die, there are no comets seen :
(*b*) Cæsar's spirit———————————
Shall in these confines with a monarch's voice
(*c*) O, what a fall was there my countrymen :
(*d*) O Cassius, you are yoked with a lamb.

Penmanship :—Write in large hand as a specimen of Penmanship, the words—

William Shakespere.

Write in small hand the sentence—

I had rather be a dog and bay the moon than such a Roman.

GRAMMAR AND COMPOSITION.

MALES.

(*Three hours allowed for this paper.*)

No candidate may omit the exercise in Composition. Question I. in Grammar must be answered by all, and any five of the other six questions may be taken, but five only.

Composition.—Write in plain prose an essay on *one* of the following subjects :—

(*a*) A rolling stone gathers no moss.
Or, (*b*) There is a tide in the affairs of men
Which, taken at the flood, leads on to fortune.
(*c*) The virtuous mind doth ever walk attended
By a strong siding champion—Conscience.

Grammar.—I. Paraphrase *three* of the following passages :—

(*a*) I could be well moved if I were as you;
If I could pray to move, prayers would move me;
But I am constant as the northern star,
Of whose true-fix'd and resting quality
There is no fellow in the firmament.

(*b*) His silver hairs
Will purchase us a good opinion
And buy men's voices to commend our deeds:
It shall be said, his judgment ruled our hands;
Our youths and wildness shall no whit appear,
But all be buried in his gravity.

(*c*) If all the world
Should in a fit of temperance feed on pulse,
Drink the clear stream, and nothing wear but frieze,
The All-giver would be unthank'd, would be unprais'd,
Not half his riches known, and yet despised.

(*d*) We will not take upon ourselves the invidious office of settling precedency between two such writers. Each in his own department is incomparable; and each, we may remark, has wisely, or fortunately, taken a subject adapted to exhibit his peculiar talent to the greatest advantage.

II. Explain *six* of the following :—Being mechanical, you ought not to walk upon a labouring day without the sign of your profession. In Parthia did I take thee prisoner. He doth bestride the narrow world like a Colossus. The Ides of March. Lay it in the prætor's chair, where Brutus may but find it. I held Epicurus strong. My ancestors did from the streets of Rome the Tarquin drive. One that feeds on abjects, orts, and imitations. They could not find a heart within the beast.

III. Explain two of the following passages, stating the circumstances under which they occur :—

(*a*) I remember
The first time ever Cæsar put it on;
'Twas on a summer's evening in his tent
That day he overcame the Nervii.

(*b*) But, for mine own part, it was Greek to me.

(*c*) Between the acting of a dreadful thing,
And the first motion, all the interim is
Like a phantasma, or a hideous dream.
The Genius and the mortal instruments
Are then in council.

IV. Comment on two of the following extracts :—

(*a*) Two such I saw, what time the labour'd ox
In his loose traces from the furrow came,
And the swink't hedger at his supper sate.

(*b*) Peace brother, be not over exquisite
To cast the fashion of uncertain ills.

(*c*) What chance, good lady, hath bereft you thus?
Dim darkness, and this leafy labyrinth.
Could that divide you from near ushering guides?
They left me weary on a grassy turf.

V. Sketch briefly the character of Cassius.

VI. Comment briefly on four of the following :—The subject of Milton, in some points, resembled that of Dante; but he has treated it in a widely different manner—They went through the world like Sir Artegal's iron man Talus—He has not a word to say of the illustrious dead of Santa Croce—Cato did as much as the Tatlers, Spectators and Freeholders united to raise Addison's fame—Bless thee! Homer; thou art translated indeed.

VII. Give briefly the plot of Comus, *or* a short outline of Anthony's speech.

N.B.—Test papers on Geography, History, French, Latin, Music, Political Economy and Needlework will appear next month. ANY CANDIDATE DESIROUS OF HAVING HIS ANSWERS TO THE ABOVE QUESTIONS (AND THOSE TO BE SET NEXT MONTH) THOROUGHLY EXAMINED, SHOULD FORWARD THEM, TOGETHER WITH P.O.O. FOR HALF-A-CROWN, TO 'THE EDITOR OF THE PRACTICAL TEACHER,' BEFORE THE 13TH OF EACH MONTH.

ANSWERS TO CORRESPONDENTS.

We shall be pleased to reply briefly and through this column to any seeking information or advice, but we are compelled to decline working problems, &c. Answers demanding urgency will be promptly forwarded per post on receipt of stamped and addressed envelope.

In answer to several correspondents, and also as supplementing our various replies sent per post, we particularly call attention to the following paragraph, this year inserted in the Syllabus for the first time:—

'*The Paper on Algebra and Mensuration will also contain some questions on Arithmetic. Students and Acting Teachers who have not passed with credit in Arithmetic in the preceding year, or who have failed to obtain a certificate, must answer the questions in Arithmetic, INSTEAD OF those on Mensuration.*'

SELF-HELP.—We are compelled to decline to examine worked papers, either gratuitously or for remuneration. But see "N.B.," supra.

A. S. (near Bradford).—Kindly address to 'The Query Editor' of PRACTICAL TEACHER.

H. P. S. (Wolverhampton), J. E. R. (March), T. B. (Sheffield), G. F. V. (Merthyr), CONSTANT READER (Cheadle), RUSTICUS (Aylesbury), S. H. (Birmingham), T. R. N. AND S. B. (Darlington), NEMO (Stockport), answered per ordinary letter.

EX-P. T. (Birmingham), Ex-P. T. (Smethwick), W. B. (Cardiff).—See supra.

OBLIGED (Sheffield).—One only of your Science subjects will count.

M. S. S.—See our notes on music in this month's issue.

H. A. J. (Cheltenham) and B. C. (Newcastle, Staffs.).—Our plan does not contemplate the supercession of Manuals; and accordingly we have not commented 'in extenso' on the given play and essays. Procure Stevenson and Whalley's Addison, published by Mackie & Co., Warrington.

(To be continued.)

—o—

How a Scotch School was Examined.

Infants.—In Class I., each child read a few lines from Nelson's Infant Reader.

Writing.—Capital letters K, M, W, Y, S, and the same small; and besides these they wrote their names.

Mental Arithmetic.—7 and 6? 7 and 3? 8 and 5? 2 from 8? 1 from 10? 4 from 12? How many in a dozen? In a score? A pair? 5 pairs? &c.

Class II. read from Nelson's Primer, and were asked to spell small words.

Writing.—1. Small letters c, h, a, i, n.
2. Copied from board 'come,' 'man.'

Mental Arithmetic.—5 and 2? 4 and 3? 6 and 4? 4 apples and 2 more? Tom had 6 apples but lost 3, how many left? 6 from 6? &c.

Class III. read on large reading sheets.

Writing.—Copied from board, a, e, i, o, u, also figures 2, 4, 5, 6.

Arithmetic.—Counted the balls on the ball-frame.

Singing.—Infants and Standard I. sang together two songs, one of which was 'Action.'

Note Tests.—d r s d' d r r d t, d.

Object Lesson.—Teacher questioned on an 'Orange.'

No sewing or needle drill taken.

STANDARD I.

Reading.—1. This was taken from Nelson's Royal Reader, I., and every second child read a sentence.

2. Questions on the subject-matter were asked round the class.

3. Spelling of short words taken.

Writing.—Each child wrote the first line of the lesson read.

Singing was the same as Infants.

Needlework was not taken.

Arithmetic.—

A. 1. 405 + 720 + 700 + 609 + 90. 2,524. Ans.

2. 684 + 765 + 897 + 749 + 111. 3,206. Ans.

3. 702 − 195. 507. Ans.

B. 1. 900 + 701 + 800 + 905 + 19. 3,325. Ans.

2. 795 + 876 + 908 + 850 + 222. 3,651. Ans.

3. 803 − 296. 507. Ans.

STANDARD II.

Read from both sets of books—Star Readers and Chambers' Graduated. A few sentences were read, and then they were told to turn over, say to page 45, and there a few sentences were read, and a change made to the other set.

Some meanings of single words were taken, and the class tested generally as to knowledge of verbs and adjectives.

Writing.—Copy-books looked; pupils were told to open these at the worst page.

Dictation.—'At one end of the saw a handle is fixed. The person who uses the saw takes hold of the handle and forces the saw up and down through the wood.'

Arithmetic.—1. 9007 + 7080 + 900 + 8790 + 9876 + 7698 + 7695 (*words*). 50,146. Ans.

2. 7,012,034—913,048 (*figures*). 6,098,986. Ans.

3. 8,647,530 × 6. 51,885,180. Ans.

For *Music*, see Standard III.

Standard III. read alternately from Star Reader III, and from Scottish Reader III. in the same fashion as Standard II., the Grammar and Analysis being taken after they had all read. Simple sentences were chosen from both books and questions were given on verbs, nouns and adjectives. Meanings were asked as usual.

Recitation:—'The Village Blacksmith'—A few lines repeated by the individual members of the class pointed at by the inspector, and the meanings taken after the manner of an object lesson.

Dictation:—'When all are linked together, the monkeys at the lower end of the chain make it to swing to and fro across the stream. It swings further and further each time, till at last the monkey at the bottom of the chain gets within reach of a tree on the opposite side. He grasps a branch and holds on by it firmly.'

Arithmetic.—1. From £10,000 take £90 10s. 0½d. £9,909 9s. 11½d. Ans.

2. Multiply eight hundred and forty-seven thousand six hundred and ninety-five by eight thousand nine hundred and seven. 7,550,419,365. Ans.

3. Divide one hundred and forty thousand eight hundred by seven hundred and forty nine. $187\frac{737}{749}$. Ans.

4. Divide 79,068,451 by 84 (*factors*). $941,291\frac{7}{84}$. Ans.

History.—Bruce.—His native place—titles—murder of Comyn — coronation — Bannockburn — treaty of Northampton—death. Mary's birth—childhood—life in France—return to Scotland—imprisonment in Loch Leven—Langside—flight to England—treatment there—execution.

Geography.—Questioned as the examination on history was proceeding.

Teacher of class put some test questions on the mountains and rivers of Scotland.

Music.—Modulator (Key C.) **d f r s fe s l d' t l d' ta l s f r d.**

Ear Test.—(Voluntary.)—**d r m, m f s, s l t, l t d'.**

Singing taken with IV. V. VI. The inspector expressed his opinion that the singing of II. and III. should be taken at a different time from that of the higher standards.

Standard IV. professed Star Reader IV. and the Scottish Reader IV., but the first book was used entirely in testing for a pass. Grammar and analysis were taken from lesson read, but no great difficulty was experienced in these exercises. Meanings as usual were taken from the reading lesson, and phrases too were asked to be explained. Writing copies were not looked.

Dictation.—'On reaching the gate at the entrance to his house, he found it closed, but the frightened horse dashed it open, and carried its master safely into the courtyard. They were followed by nine out of the eleven wolves, but most fortunately at the very instant that the wolves entered, the gate swung back on its hinges, and thus they were caught as in a trap. In a moment the cowardly creatures became completely changed.'

Recitation.—'I hear thee speak of a better land' and 'Burial of Sir John Moore.' A verse from each, and meanings of phrases and words. A few questions were given to see how much they knew of the 'Life of Sir John Moore' and of the events of the Peninsular war.

Arithmetic.—(1) Divide £406,921 12s 3d. by 468. £869 9s. 9¾d. Ans.

(2) Multiply £64 18s. 7½d. by 48. £3,116 13s. 0½d. Ans.

(3) Reduce six hundred and eighteen thousand three hundred and five ounces to hundredweights. 345 cwts. 0 qrs. 4 lbs. 1 oz. Ans.

(4) How many persons will get allotments of 3 acres out of 40,800 sq. poles? 85 persons. Ans.

History.—The class generally was questioned (1) on the reign of James I., touching on the Gunpowder Plot, Ulster, and the Spanish Match; (2) on Anne's reign, Treaty of Union, War of the Spanish Succession, with Marlborough's Life and Victories; Gibraltar.

Geography.—Localities of principal British industries; which side of Britain mountainous, result of this; cities and towns on Clyde, Mersey, Thames, and Severn; a voyage round the South and West coasts of England.

Standard V. professed a History and Geography Reader, as also Star Reader VI., which they read in conjunction with Standard VI. Lesson taken was 'Upward,' p. 73. Explanation, Grammar and Analysis were taken from the same, and, as will be seen, the difficulties were not great.

Recitation was taken along with VI., which see.

Abstract.—'The Monkey and the Mirror.'

Arithmetic.—(1) Find the value of 6 boxes, two weighing $1\frac{1}{2}$ cwts. each and four weighing 2 qrs. 7 lbs. each at $6\frac{1}{2}$d. per lb.

£15 18s. 6d. Ans.

(2) Make out the following bill:—
11 lbs. coffee at $1\frac{1}{2}$d. per oz.
18 lbs. flour at $5\frac{3}{4}$d. per lb.
1 cwt. soap at $2\frac{1}{2}$d. per lb.
17 pecks meal at 1s. 2d. per peck.

£1 2s. + 8s. $7\frac{1}{2}$d. + £1 3s. 4d. + 19s. 10d.
= £3 13s. $9\frac{1}{2}$d. Ans.

(3) If 2 qrs. $3\frac{1}{2}$ lbs. be carried for 4s. 4d. what weight will be carried for £1 18s. 6d.?

4 cwt., 2 qrs., $24\frac{33}{52}$ lbs. Ans.

(4) Simplify $(\frac{8}{9}$ of $5\frac{1}{2}) \div (\frac{1}{3} - \frac{1}{8})$.

22. Ans.

History.—The portion particularly gone into comprised the events from 1789 to 1816. The lives of Nelson and Wellington afforded ample scope for interrogation.

Geography.—As in Standard IV. the places in the historical lesson formed the basis of a number of questions, and besides these the mountains and rivers of Southern Europe, together with the principal seaports, were largely run upon.

Standard VI. read the same book as Standard V., Nelson's Star Reader No. VI., and were called upon to point out easy prefixes and affixes, and show the effect these had in modifying the meaning of words, and in making new ones. The analysis was not too easy, but they satisfied the inspector if able to distinguish a compound from a complex sentence. The parsing was easy.

Writing.—Composition of an essay on 'Farm Work,' or 'A Dream.'

Arithmetic.—1. At what rate per cent. will £1,050 in two years produce £84 at simple interest?

4 per cent. Ans.

2. Reduce $3\frac{3}{7}$ of £2 15s. to the fraction of £3 17s.

$\frac{1320}{1539}$ or $2\frac{142}{539}$. Ans.

3. A train travelling 33 miles an hour does a journey in 2 hrs. 15 min.; how long will an express going at the rate of 54 miles an hour take to do double the distance?

2 hrs. 45 min. Ans.

4. Reduce 4 miles 3 fur. 12 yds. to the decimal of 1 mile.

4·381. Ans.

Geography.—Draw a map of (1) S. America, (2) India, (3) New Zealand. Oral examination on S. America and British India; general features, towns, and a few notes.

History.—All the principal wars of the present reign, with particulars of the Crimean War, and of the Indian Mutiny.

Recitation.—Standards V. and VI. had prepared the same piece from 'The Lady of the Lake.' Phrases, words and a question or two to discover if any of the class knew what was meant by figures of speech as contrasted with 'parts of speech.'

Music.—Modulator.—Key C. **d f l d' r' t s d' ta l se l s fe s m r t_1 d l se l t d'** with transitions to right and left and back again to C.

Ear Test.—(Voluntary.)—C struck on harmonium.—**dms, dfrm, sfels, dfls, dtsl.**

Time Exercise.—

1 : — : 1	— : 1 : 1	— : : 1	1 : — : — ‖

Sight Test.—Key D.

d : — : f	s : fe : s	l : — : m	}
d : t_1 : l_1	t_1 : d : —	s : l : —	}
s : — : f	m : m.r : r .t_1	d : — : — ‖	

Much more stress was laid upon the above than on the singing of a prepared song, though praise was given for the manner in which the pupils showed the 'light and shade.'

Sewing was examined as per Schedule 3.

How my School was Examined.

BY THE

HEAD MASTER OF A LONDON SCHOOL.

Two or three days before the day appointed for the examination, Her Majesty's Inspector visited the school to hear the pupil-teachers' reading, recitation, and teaching. For a test in the latter subject, the pupil-teacher gave a reading lesson to Standard I.

At the time fixed for the examination, the chief inspector, sub-inspector, and two assistants, came to the school and divided the work amongst them. Standards III. and IV. were seated alternately in two rooms with a sliding partition, and set to their paper work, cards being given for arithmetic, and the dictation given out afterwards by one of the assistant inspectors. In each case the teacher of the Standard was allowed to repeat the passage dictated.

Standards V. and VI. were similarly intermingled in another room, and the work arranged by another of the inspectorial staff. Standards I. and II. were examined in separate rooms by the other inspectors. The reading of the various Standards was examined by the different inspectors as the written work was completed. In this way the ordinary essential subjects were speedily dealt with, and the classes dismissed without any serious overstepping of the usual time for closing morning school.

Afterwards, the class subjects—English, geography, and singing—were taken in the different Standards, map drawing in Standards V. and VI., and stages I. and II. in Algebra. Standard III. being a large standard was divided into two parts for class subjects; one was examined orally in English, and the other in geography.

STANDARD I.

Arithmetic.—One addition and two subtraction sums as follows:—

A. (1)	9	(2) 903	(3) 941
	780	207	33
	655		
	874		
	607		
B. (1)	9	(2) 805	(3) 702
	780	106	5
	655		
	874		
	761		

Answers.—*A.* (1) 2,925; (2) 696; (3) 908.
B. (1) 3,079; (2) 699; (3) 697.

Writing.—The same words were dictated to the whole class:—*Robin, sister, Monday, crumbs, bread, morning, snow, boots, white, coat.*

Reading was tested from the Holborn New Reader, No. I., the lesson chosen being 'The Little Swineherd;' and from Nelson's New Royal Reader.

Recitation was heard separately and together, the piece prepared being 'Robin Redbreast,' by William Allingham. Simple questions were asked, such as Why is the robin called red-breast? What does *ruddy* mean? Why are 'the frosty ways like iron'? The meaning of 'plumed'?

Mental Arithmetic questions were asked generally, and certain boys selected to answer. If I buy a loaf for 3½d. and pay for it with a shilling, how much change must I have? If all the change is given in halfpennies, how many will there be? How many halfpennies in 3½d.? How many in a shilling? What two numbers added together will make 17? What other two? How many are 5 times 6? and so on.

Geography.—Easy questions were asked on the meaning of a map. Which part is the north? What do these wavy lines represent? Which is the north of the room? Where does the sun rise?

Singing.—A simple voluntary was pointed on the modulator, and the following time test written on the black-board:—

| 1 : — : — | 1 : — | 1 : — | 1 : — | — : 1 | 1 : 1 | — : 1 ‖

Questions were asked on the kind of measure. The last measure is noticeable as difficult for Standard I. The songs sung were 'Come, let us take a holiday,' and 'Winter, thou art very cold.'

STANDARD II.

Arithmetic.—Two sets of sums were dictated.

A. (1) 42,856 × 86.
(2) 7,395 × 407.
(3) 40,009 ÷ 9.
(4) 20,060 — 111.

B. (1) 42,856 × 57.
(2) 7,395 × 309.
(3) 40,009 ÷ 8.
(4) 20,060 — 101.

Answers. — *A.* (1) 3,685,616; (2) 3,009,765; (3) 4,445 + 4; (4) 19,949.

B. (1) 2,442,792; (2)2,285,055; (3) 5,001 + 1; (4) 19,959.

Dictation.—The following passage was dictated from Nelson's New Royal Reader, No. I.:—'The widow felt glad when the thought flashed through her mind. She found that if she worked an hour later each night, she could earn enough to pay for the oil to feed the lamp. So she sat up and earned the money to buy the oil. Then she trimmed the lamp, and placed it at the window each night.'

Reading was tested from the same book as the dictation.

English.—The grammar questions were based on the reading lessons, boys being asked for verbs and nouns in the passages read. The piece prepared for recitation was Mrs. Hemans' 'Casabianca,' and easy questions were given on the meaning of the story.

Geography.—In this subject the teacher was allowed to ask the questions.

Singing.—A voluntary was pointed on the modulator, and the following time-test sung from the black-board:—

| 1 : — : — | 1 : 1 : 1 | 1 : — : 1 | 1 : — : — ‖

The songs sung were 'Mr. Nobody,' and 'To the Woods.'

STANDARD III.

Arithmetic.—Samples of cards set:—

A. (1) Add £88,769 15s. 8¾d., £807 17s. 11½d., £97,096 9s. 9¼d., £78,654 18s. 10¾d., £19 16s. 7½d.

(2) Subtract £10,429 15s. 6½d. from £11,019 11s. 0¼d.

(3) Take 19 times 190 from half-a-million.

(4) There are ten houses, each containing 12 windows with 24 panes in each window, and 9 windows with 20 panes each; and there are 12 houses, each containing 15 windows with 24 panes in each window. How many panes of glass are there altogether?

B. (1) Add £809 18s. 6½d., £74,980 16s. 9¼d., £87,658 9s. 11½d., £4,839 17s. 10¾d., £88 18s. 8½d.

(2) From £61,002 10s. 6d. take £59,463 12s. 10½d.

(3) A man has a holiday of three weeks at the seaside. The first week he spends £2 17s. 6d., the

second week he spends £2 12s. 6d.; and then he finds that he has spent 30 shillings more than the half of what he had at first. How much has he left for the third week?

(4) Divide five hundred thousand and ten by one hundred and twenty-six.

C. (1) Add together £57,098 10s. 11½d., £68,754 18s. 7¾d., £903 17s. 8½d., £6,580 9s. 6¾d., £47,927 14s. 10¾d.

(2) Divide nine hundred thousand three hundred and fifty by ninety-seven.

(3) Take £8,922 15s. 4¾d. from £90,212 11s. 2d.

(4) In a class of 40 boys, fifteen had 4 sums right each, ten had 3 each, eight had 2 each, and the remainder had 1 each. How many sums were done right?

D. (1) Add £6,587 18s. 9¾d., £76,093 14s. 10½d., £869 8s. 0¼d., £84,008 17s. 11d., £5,674 16s. 8¾d.

(2) Divide nine hundred and one thousand three hundred and ten by nine hundred and seven.

(3) Subtract £7,263 os. 7¼d. from ten thousand pounds.

(4) If the number of boys in a school were twice as many as it is, there would be 74 less than a thousand. How many does the school contain?

In the above sums many of the amounts were expressed in words.

Answers: — *A.* (1) £265,348 18s. 11¾d.; (2) £589 15s. 5¾d.; (3) 496,390; (4) 9,000 panes.

B. (1) £168,378 1s. 10½d.; (2) £1,538 17s. 7½d.; (3) £2 10s. 0d.; (4) 3,968 + 42.

C. (1) £181,265 11s. 9d.; (2) 9,281 + 93; (3) £81,289 15s. 9¼d.; (4) 113 sums right.

D. (1) £173,234 16s. 4¼d.; (2) 993 + 659; (3) £2,736 19s. 4¾d.; (4) 463 boys.

Dictation.—The following passage was dictated from Longman's New Reader, No. 3:—

'But even the strength of the younger lads seemed to grow into the strength of giants when they saw through the clear water a great moving mass like quicksilver. And then the wild excitement of hauling in—the difficulty of it—the chance of the fish escaping—the warning cries of Rob—the danger of swamping the boat!'

Reading was heard from Longman's New Reader, Moffatt's Stories from English History, and Gill's Whitehall Geographical Reader.

Mental Arithmetic included such questions as—What are the factors of 30? of 48? other factors of same numbers? How many farthings in a shilling? pence in half-a-crown? half-crowns in a pound?

English.—The piece recited was Longfellow's 'Wreck of the Hesperus.' Such questions were asked as—What is the 'skipper'? What words are used to represent the wind? What does 'lashed' mean? Why was the daughter lashed to the helm? What is a 'scornful laugh'?

The *Grammar* was tested by asking for the parts of speech in sentences read.

Geography.—Such questions were asked as related to the occupations of the people in different parts of the country, and the reasons for manufactures and other industrial pursuits being carried on in particular districts.

Singing.—A voluntary pointed on the modulator, including all the intervals in the diatonic scale, and particularly the phrase **d' ta l t d'**. The songs sung were:—'The Crystal Spring,' 'Strike up a joyful roundelay,' and 'Wanderer through moor and wildwood.'

STANDARD IV.

Arithmetic.—Specimen cards:—

A. (1) Multiply £639 10s. 0¼d. by 609.

(2) Divide £272,541 7s. 11d. by 290.

(3) Reduce 1 square mile 3 roods 3 square yards to square feet.

(4) John saves 1d. per day, and James 6d. per week; how much does each save in 3 years?

B. (1) Reduce 79 acres 3 roods 20 poles 5½ square yards to square yards.

(2) Divide £7,060 18s. 10d. by 73.

(3.) Find the cost of 57 couples of rabbits at 1s. 9d. each.

(4) A man undertook to cut 27 lengths, each 7½ inches, out of a plank 5½ yards long. How much was it too short?

C. (1) Divide £1,076 4s. 3¾d. by 527.

(2) Multiply £19 19s. 11¾d. by 749.

(3) How many times will a clock tick in a day, if it ticks once every half second?

(4) How many lbs. of tea at 3s. 4d. per lb. will cost the same as 150 lbs. of coffee at 1s. 4d. per lb.?

D. (1) Reduce 81 cwt. 1 qr. 9 lbs. to drams.

(2) How much will 1 ton of coals cost if 135 tons cost £180?

(3) Divide £7,250 10s. 6d. by 23.

(4) How many hurdles 5 ft. 6 in. long can I get out of a fence 17 miles 5 furlongs 27 poles long?

Answers.—*A.* (1) £389,456 2s. 8¼d.; (2) £939 15s. 11½d.; (3) 17,021,097 square feet; (4) John £5 15s. 3d., James £3 18s.

B. (1) 386,600½ square yards; (2) £96 14s. 4¼d. + 57; (3) £9 19s. 6d.; (4) 4½ inches.

C. (1) £2 os. 10d. + 247f.; (2) £14,979 4s. 4¾d; (3) 172,800 times; (4) 60 lbs.

D. (1) 2,315,904 drams; (2) £1 6s. 8d.; (3) £315 4s. 9½d. + 14; (4) 17,001 hurdles.

Dictation.—The following passage was read out from Nelson's Royal Reader, No. IV.:—

'Two boys were apprenticed in a carpenter's shop. One determined to make himself a thorough workman, the other "didn't care." One read and studied and got books that would help him to understand the principles of his trade. He spent his evenings at home reading. His companion liked to go with other boys to have a "good game." "Come," he often said to his shopmate, "leave your old books; come with us. What's the use of all this reading?"'

Reading was tested from Gill's Albert Geographical Reader, Standard IV., Nelson's New Royal Reader, and Gardiner's Outlines of English History, Part I. The boys were called up, six at a time, and the three books were brought into use in the successive groups.

English.—The passage for recitation was 'The Chase,' from Scott's 'Lady of the Lake.' The lines were repeated by individual children, and questions were asked on the meanings of words and phrases, also on the mountains and lakes mentioned in the passage.

Then these two lines were taken, as a grammar test:—

'The deep-mouthed bloodhound's heavy bay
Resounded up the rocky way.'

Questions asked:—How many verbs are there in these lines? Which is the verb? Parse 'resounded.' What kind of adjective is 'deep-mouthed'? What number of degrees have adjectives? Compare 'deep-mouthed.' What is the case of 'bloodhound's'? Is it singular or plural? What does 'resounded' agree with? What do prepositions govern? In what case? Compare 'rocky.'

Geography.—What is the port of Edinburgh? What ports are on the Clyde? Why was the exhibition held in Glasgow? Where is linen made? Name other seaports of Scotland? A fishing village in the north of Scotland? A place noted for herrings? A river noted for salmon? Why is the Clyde a bad place for salmon? What is the chief town of the Hebrides? What Prince took his title from Edinburgh? What Prince took his title from Connaught? Name a packet-station on the north of Ireland. Name some rivers in Ireland. What is Belfast noted for? Name a port in the south. What are the chief exports from Cork? Where do they make gloves? What is the capital of Ireland? Name some towns in Munster—in Ulster—in Leinster—in Connaught.

Name a river in British Columbia. Name some Arctic explorers. Some straits and bays named after them. What are the divisions of Canada? What river in British Columbia is noted for salmon? Name a range of mountains in the west. Its two highest points. What animal is found in the Rocky Mountains? What is Manitoba noted for? Why is it so fertile? Name a great railway in Canada. What place would a farmer be likely to emigrate to?

Singing.—A long voluntary was pointed on the modulator, and a few ear-tests given. From five three-part songs, which had been prepared, three were chosen—Mendelssohn's 'The Woods,' Crampton's 'The Snail,' and Sieg's 'O'er the limpid azure.' The following test was given for sight-singing:—

Key D. Key G. Key D.

d s m f r d m s d' | d' s f m r f m | m' l t d' | s m d m r l s t, d,

and the following time-test:—

| 1 : — : 1 | 1 :-.1 : | 1 : 1.1 : 1 | 1 : : 1 ‖

STANDARD V.

Arithmetic:—Specimen Cards:—

A. (1) Add $\frac{1}{6}+\frac{2}{3}+\frac{2}{7}+\frac{3}{5}$.

(2) Make out the following bill:—2½ lbs. at 3s. per lb., ¼ lb. at 1s. 9d. per lb., 12 lbs. at 9½d. per lb., 8 lbs. at 2½d. per lb., 108 lemons at 10d. per dozen.

(3) Find the cost of 29 qrs. 7 bush. 1 peck at £3 per quarter.

(4) A train carried 80 first-class passengers at 3d. per mile, 160 second-class passengers at 1½d. per mile, and 240 third-class passengers at 1d. per mile. What will all the fares amount to for a journey of 65 miles?

B. (1) If 18 men mow a field in 12 days, how long will it take 9 men to do it?

(2) Find the cost, by practice, of laying a telegraph wire measuring 3 miles, 7 furlongs, 8 poles, at 1d. per yard for the wire and £4 10s. for the labour.

(3) Take $\frac{1}{3}$ from the sum of $\frac{2}{3}$ and $\frac{2}{9}$.

(4) Make a bill for 120 eggs at 9d. a dozen, 15½ lbs. at 5½d. per lb., 14 lbs., at 3d. per lb., 56 lbs. at 7¾d. per lb., and 19½ lbs. at 7d. per lb.

Answers: A. (1) $1\frac{43}{126}$. (2) 7s. 6d. + 5¼d. + 9s. 6d. + 1s. 8d. + 7s. 6d = £1 6s. 7¼d. (3) £89 14s. 4½d. (4) £195.

B. (1) 24 days. (2) £33 2s. (3) $\frac{5}{9}$. (4) 7s. 6d. + 7s. 1½d. + 3s. 6d. + £1 16s. 2d. + 11s. 4½d. = £3 5s. 7¾d.

Composition. This was examined by the inspector telling the following anecdote, and requiring the boys to reproduce it:

'An artist once visited a remote part of Scotland, and, seeing some dogs in a village, made some sketches of them in his note book. The next day when he went into the village to pursue his search for sketches, he was surprised to find a number of the dogs drowned in a pool. Noticing a little boy carrying a dog to a pool, he asked him what he was going to do with it, and the boy replied that he had been sent to drown it. He afterwards sought the reason of this wholesale drowning of dogs, and was told that the villagers had taken him for an exciseman, and they were afraid they would be fined for keeping dogs without a license; so they had drowned their dogs in order to avoid the tax.

STANDARD VI.

Arithmetic: The boys being intermingled with Standard V., the same set of sums was given to all.

(1) Add $\frac{1}{16}$ ton + $5\frac{1}{8}$ cwt. + $5\frac{3}{32}$ lbs. + $14\frac{1}{2}$ ozs.

(2) Find the value of

18·20725 + 33·25 + 718968 − 16·28975.

(3) The interest on £1,450 for two years is £108 15s. What is the rate of interest?

(4) One man earns as much as three boys, and four men and five boys working together earn £2 2s. 6d. in one day. What will one man and one boy earn?

Answers: (1) 5 cwt. 1 qr. 8 lbs. (2) 719003·1675. (3) $3\frac{3}{4}$ per cent. (4) 7s. 6d. + 2s. 6d. = 10s.

Composition.—Different exercises were given to different boys. The following were some of the subjects set:—

A. An account of an excursion into the country.

B. A visit to the seaside.

C. The children's Jubilee celebration in Hyde-park.

D. Railway bookstalls.

E. What trade would you like to be?

STANDARDS V. AND VI.

These two Standards having been taught as one class were in most other subjects examined together.

Reading was tested by reading from Longmans' New Standard Reader, No. 5, and Longmans' New Geographical Reader, Standard VI.

English.—Individual boys recited passages from the piece prepared, namely, the Quarrel between Brutus and Cassius from 'Julius Cæsar.' Simple questions were asked on the meaning.

Grammar was examined orally by questions on sentences read. Thus, 'Suddenly his grave face lighted up, and his stern grey eyes sparkled with joy.' How many sentences are there? Which are they? 'Far away along the eastern sky he saw a bristling line of tall masts, with a flag, which he knew well, floating out over them.' Which is the principal sentence? Parse *Far*, *away*, *along*, *sky*, *which*, and other words.

Analyse 'And attempts to throw off his new master, who sits calmly on his back.'

In the word *unfortunately*, what is *un*? What does it mean? What is *ly*? What does it do to the word?

Geography.—The course approved and prepared included Asia, Africa, and America; but the questioning was confined to Africa, and the teacher of the class was allowed to put some of the questions.

What important physical feature is there in Egypt? What natural phenomenon is remarkable there? What extent of country is affected by the inundation of the Nile? What part of the Nile has been lately explored? Name some of the famous travellers in Africa. What is Africa sometimes called? Why is it called the 'Dark Continent?' How are the mountains situated? What mountains are in the north? What kind of country lies south of the Atlas Mountains? What plague is now prevailing in North Africa, in Algiers? Where did Carthage formerly stand? What town is now near its site? Do the extreme heat and drought prevent communication amongst natives as they do amongst Europeans? Where is the Orange River? Why is it so called? Describe the navigation of the Orange River?

Three maps, approved the previous year, had been prepared for drawing from memory, namely: India, New Zealand, and the basin of the St. Lawrence. These were allotted to the boys in rotation and drawn on paper.

Singing:—The note and time tests on the blackboard were the same for Standards V. and VI. as those given for Standard IV. A few ear tests were given by the Inspector, and a rather long voluntary pointed on the modulator. The songs sung were 'The Hardy Norseman,' 'The Switzer's Song of Home,' and 'The Swabian Trooper's Song.'

STAGE I.

Algebra.—(1) Subtract the sum of $3a-2b$ and $2b+3c$ from $5a-b+2c$.

(2) Simplify $x^2-[9-\{3x+5-(4x+x^2)\}]$, and find the numerical value when $x=2$.

(3) Divide $x^4-p^2x^2+2pqx-q^4$ by x^2+px-q^2.

(4) Multiply together $x+1$, $x-2$, and $x+3$.

(5) What is meant by the power of a quantity, and what by a root?

STAGE II.

(1) Find the L.C.M. of $4(a^2+ax)$, $12(ax^2-x^3)$, and $18(a^2-x^2)$.

(2) Find the value of x in the following:—

$$\frac{3x-4}{7}-\frac{x-17}{2}=6\tfrac{1}{2}.$$

(3) Simplify $\frac{1}{a-b}-\frac{2b}{a^2-b^2}+\frac{1}{a+b}$

(4) Divide £36 between A and B so that B's share may be $3\frac{1}{2}$ times A's share.

(5) Multiply $\frac{x-a}{(x-a)^2}$ by $\frac{x^2-a^2}{x^2+a^2}$

Answers: I. (1) $2a-b-c$. (2) $-x-4=-6$. (3) x^2-px+q. (4) x^3+2x^2-5x-6. (5) If a given quantity is multiplied by itself any number of times, the result is called a power of the given quantity. Thus $a\times a=a^2$ is the second power of a; $a\times a\times a=a^3$ is the third power, and so on. a is called the first power. A root of a given quantity is such a quantity that if multiplied by itself an indicated number of times it would produce the given quantity. Thus a is a root of a^2, and of a^3; of a^2 it is the square root, of a^3 it is the cube root.

II. (1) $36ax^2\ (a^2-x^2)$. (2) 20. (3) $\frac{2}{a+b}$

(4) A £8, B £28. (5) $\frac{x+a}{x^2+a^2}$

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Pupil Teachers' Preparation Papers.

THE following is a test paper for the pupil teachers whose year ends in April. It covers about half the year's work. Every pupil teacher should try the paper within the time specified. A goodly and increasing number of the October teachers availed themselves of our offer to examine, correct and revise their papers. We renew the offer. Head teachers wishing to get an independent opinion of the work of their pupil teachers, and a judgment based upon comparison with the work of teachers throughout the country; or pupil teachers working the questions at home, will have their papers returned post free by the end of November if they will forward their answers with a postal order for one shilling to the Editor of *The Practical Teacher*, 4, Pilgrim Street, Ludgate Hill, London, E.C., by the 10th of the month.

HALF YEARLY TEST PAPER FOR PUPIL TEACHERS WHOSE YEAR ENDS IN APRIL.

Directions.

1. Write on half sheets of foolscap, and on one side only.

2. At the top of each half sheet write your name in full, the full address of your school, and the year the papers of which you are taking.

3. Do not write the questions, but prefix to each answer the number of the question to which it corresponds.

4. Do not use any book or writing from which answers may be copied.

5. Keep strictly to the time allowed.

6. If you have not time to answer all the questions, choose those you can answer best; but do not omit the whole of any one subject.

7. If you wish them examined, corrected, and valued, send them to the office of the 'PRACTICAL TEACHER,' Pilgrim Street, Ludgate Hill, together with a shilling postal order, not later than the 10th November. They will be returned post free.

END OF FIRST YEAR.

(Three and a half hours allowed.)

Arithmetic.

(Do three questions only, including question 4, if you can.)

MALES ONLY.

1. Define clearly.—*Vulgar Fraction, Mixed Fraction, Proper Fraction, Improper Fraction.* Give examples of each, and classify these fractions in the order of their magnitude:—$\frac{5}{8}$, $\frac{7}{10}$, $\frac{11}{12}$, $\frac{11}{18}$. (30)

2. Find the G.C.M. of 218,484 and 73,170, and the L.C.M. of 20, 27, 28, 35, 45 and 63. (30)

3. Reduce $2\frac{1}{2}$ guineas to the fraction of £$1\frac{3}{4}$, and express 3 roods 15 poles as the fraction of an acre. (30)

4. One ounce Troy of gold is worth £3 17s. 10½d.; find the value of a ton of gold. (40)

FEMALES ONLY.

1. Find the cost of 3 acres, 1 rood, 3 poles, 19¼ sq. yds. of land at £110 per acre. (30)

2. Find by practice the cost of 2,510 lambs at 14s. 7¼d. each. (30)

3. Coal is bought at 24s. per ton and sold for 25s. 6d.; how many tons must be sold per year to realize an income of £350? (30)

4. A Bill:—10¼ yds. ribbon at 2½d. per yd., 13$\frac{1}{12}$ yds. of calico at 8d. per yd., 106 reels of cotton at 8d. per doz., 10 pieces of tape at 2¾d. per piece and one umbrella at 10s. 6d. (40)

Geography.

MALES AND FEMALES.

(Answer three questions only.)

1. Draw a map of the six northern counties of England, *or* of Ireland. Insert parallels and meridians. (30)

2. 'England is the chief commercial country of the world.' Prove this, and give a list of the chief English ports, with particulars of their trade. (25)

3. Name the chief agricultural districts of England and Wales, and say what are the chief crops of each. (25)

4. 'England is a well-watered country.' How would you show this to a class? Trace the course of any English river. (25)

Grammar.

(Answer questions 1 and 2, and one other question.)

We buried *him* darkly at *dead of* night,
The *sods* with our bayonets *turning*,
By the struggling *moonbeam's misty light*,
And the *lantern dimly burning.*

1. Analyse the above four lines. (25)

2. Parse the words in italics. (35)

3. Give six examples of the endings of English abstract nouns, with examples. Say out of what kind of words the nouns are formed. (20)

4. What is meant by *relative pronoun, antecedent, reflexive pronoun, passive voice,* and *abstract noun?* Give examples of these, and write sentences containing them. (20)

Composition.

(Read the following story once only, and then write it from memory.)

When Agrippa was in a private station he was accused by one of his servants of having spoken injuriously of Tiberius, and was condemned by the Emperor to be exposed in chains before the palace gate. The weather was very hot, and Agrippa became exceedingly thirsty. Seeing a servant of Caligula pass by with a pitcher of water, he called to him and entreated leave to drink. The peasant presented the pitcher with much courtesy, and Agrippa, having allayed his thirst, said to him, 'Assure thyself that if I get out of this captivity I will one day pay thee well for this glass of water.' Tiberius dying, his successor soon after not only set Agrippa at liberty, but made him king of Judæa. In this high situation Agrippa was not unmindful of the glass of water given to him when a captive. He immediately sent for his benefactor, and made him comptroller of his household. (40)

History.

(Answer three questions only.)

1. Who were the Ancient Britons, Romans, Picts and Scots, Danes, Jutes, Saxons, and Angles? Give dates of the coming of these to England. (25)

2. Write a brief description of the chief Roman works in Britain. What remains of their occupation may still be found, and where? (25)

3. Name any of the leaders of the Saxon or British tribes, and give a short description of four of them. (30)

4. What historical events of the period of history you are studying are connected with the Tyne and Solway, the Forth and Clyde, the Grampians, Ethandune, Athelney, York? (25)

END OF SECOND YEAR.

FIRST PAPER.

(Three and a half hours allowed.)

Euclid.

MALES ONLY.

(Answer two questions, including question 3, if you can.)

1. Write out Euclid, Book I., Prop. 5. (20)

2. If a side of a triangle be produced the exterior angle is greater than either of the interior opposite angles. (20)

3. Enunciate the Seventh proposition of the First Book of Euclid. Draw the figures for the three cases, and say why the third case needs no demonstration. (30)

Grammar.

MALES AND FEMALES.

(Answer Questions 1 and 2, and one other question.)

'*Let* us *beware that* our rest becomes not the *rest* of stones which, *so long as* they are torrent-tossed and *thunder-stricken*, maintain their majesty, but when the stream is *silent* and the storm *passed*, suffer the grass *to cover* them, and the *lichen* to feed on them, and *are ploughed down* to dust.'—*Ruskin.*

1. Analyse the above passage. (30)

2. Parse the words in italics. (30)

3. Paraphrase the passage. (20)

4. Write a composition on the 'Moods of Verbs.' (20)

Geography.

(Answer three questions only.)

1. Draw a full map of Spain and Portugal *or* Sweden and Norway. (30)

2. Name the principal European rivers. Describe fully the course of the Danube, the Rhine, or the Rhone. (25)

3. Describe fully the physical features of France or Italy. (25)

4. Where and what are—Lyons, Geneva, Basel, Metz, St. Etienne, Badajos, Douro, Mansanares, Maladetta, Matterhorn. (25)

SECOND PAPER.

(Two hours and a half allowed.)

[Needlework for girls takes one hour.]

Arithmetic.

MALES ONLY.

(Do three sums only.)

1. In what time will £244 1s. 8d. amount to £253 4s. 8¾d. at 3 per cent. simple interest? (30)

2. Find to the nearest farthing the compound interest on £450 6s. 8d. for two years at 2 per cent., interest being payable half-yearly. (30)

3. Two friends during a walk take steps of $2\frac{2}{3}$ and $2\frac{3}{4}$ feet respectively. If they start in step, how far will they have walked before they are in step again, and how many steps will each have taken? (30)

4. The annual consumption of brandy in a country is 450,000 gallons, and the duty is 9s. 2d. per gallon; duty is reduced 6 per cent., and the consumption then increases 8 per cent.; how is the revenue affected? (40)

FEMALES.

(*Answer the Questions set for* FIRST YEAR MALES.)

History.

(*Answer three questions only.*)

1. What were the Crusades? Give a full account of the connection of any of our English kings with them. (25)

2. State the chief provisions of Magna Charta, and say how it was obtained. (30)

3. Give the chief events of the reign of Henry III. (25)

4. What were—The Domesday Book, Curfew, New Forest, Feudal System? (25)

Teaching.

(*Answer two questions only.*)

1. Explain as to a Third Standard the meaning of the following Old English proverbs:—

'Good beginning makes good ending.'
'Ill weeds grow apace.'
'A stout heart is worth more than a steel blade.' (20)

2. Describe your method of giving a reading lesson. Give the reasons for adopting your method. (20)

3. What plan do you adopt in the Infant Class to teach the children to spell? (20)

4. What use do you make of the blackboard in teaching children to write? What are the advantages of head-line copy-books? (20)

END OF THIRD YEAR.

FIRST PAPER.

(*Three hours and a half allowed.*)

Euclid.

MALES ONLY.

(*Answer two questions only, including question* 3 *if you can.*)

1. Write out the two corollaries to the thirty-second proposition of Euclid, Book I. (20)

2. The straight lines which join the extremities of equal and parallel straight lines are themselves equal and parallel. (20)

3. Find a point in the base of a triangle such that if straight lines be drawn from it parallel to the sides of the triangle and terminated by them, they shall be equal. (30)

Algebra.

MALES ONLY.

(*Answer two questions only.*)

1. Evaluate the following expressions when $a = 9$ and $x = 7$.

(1) $14a - [a - 5\{a + 3(a - x)\}]$

(2) $\sqrt{\dfrac{a^3 - x^3 - 3ax(a - x)}{a - x}}$. (25)

2. From $5[(a - b) - (c + d)]$ take $2[2(a + b) - 3(c - d)]$. (25)

3. Add together the following quotients:—

$$\frac{9m^2 - n^2}{3m - n}, \quad \frac{m^2 + 5mn + 6n^2}{m + 2n}, \quad \frac{m^2 - 16n^2}{m + 4n}, \quad \frac{m^2 - mn - 12n^2}{n - 4n}. \quad (25)$$

4. Show that $x(x+1)(x+2)(x+3) + 1 = (x^2 + 3x + 1)^2$. (25)

Mensuration.

MALES ONLY.

1. Calculate by duodecimals the area of a rectangle whose sides are 8 ft. 9 in. 10 pts. and 5 ft. 6 in. 7 pts. (20)

2. Each side of a rhombus is 120 yards, and one of its angles is 60°. Find the area of the rhombus in acres to two decimal places. (20)

Arithmetic.

FEMALES ONLY.

1. Find the value of ·2272 of £14 6s. 5½d. (30)

2. What decimal is equal to

$$\frac{1\frac{1}{8}}{1\frac{3}{4}} \div \left\{\left(\frac{4}{17} \times 1\tfrac{1}{2}\right) - \frac{1}{18\frac{8}{9}}\right\} \quad (40)$$

3. Multiply 21·945 by ·0508 and divide ·68921 by ·0041 (30)

4. On a railway there are 30 telegraph posts to a mile. If a train passes 17 of these in a minute, at what rate per hour is it travelling? (30)

Grammar.

MALES AND FEMALES.

(*Answer questions* 1 *and* 2, *and one other question.*)

1. Paraphrase the following passage:—

Like a morning *breeze*,
Which blows in summer from the gates of dawn
Across the fields of spice, and *wakes* to life
Their *slumbering* perfume through this silent land
Of whispering voices and of *half closed* eyes,
Where scarce a footstep sounds, *nor* any *strain*
Of earthly song—*thou can'st.*—MORRIS.

2. Analyse it and parse the words in italics.

3. 'Only transitive verbs have a passive voice.' Explain this. Is there any exception to the rule? If so, give examples.

4. What is a *derivative*? How are many of our words formed? Give a list of a dozen words, each having a different Latin prefix. State their meaning, and, if possible, how they are formed.

Geography.

MALES AND FEMALES.

(*Answer three questions, including question* 1.)

1. Draw a map of the basin of the Ganges, the Eastern coast of Asia, or of Siberia. Insert parallels and meridians if possible. (30)

2. What are the chief countries of Asia? Give their capitals, the rivers on which they stand, and state anything you can about the towns. (25)

3. Describe with full particulars the mountain system of Asia. (25)

4. Give a description of the climate, the productions, and the people of China, Japan, Arabia, Western Africa, Egypt, or Southern Africa. (25)

SECOND PAPER.

(*Two hours and a half allowed.*)

[Needlework for Females. *One hour.*]

Arithmetic.

MALES ONLY.

(*Answer three questions only.*)

1. The 3 p.m. express from Paddington to Exeter stops first at Swindon, 77½ miles distant, at 4.27 p.m. The whole journey is 194 miles, and 15 per cent. of the time is expended in stoppages. At what time is the train due at Exeter? (30)

2. A person has £5,000 stock in the 3 per cents., which he sells out and invests in the 3 per cents. at 87½, thus increasing his income by £5. Find the price of the 3 per cents. (30)

3. Find the present value of £808 1s. 4d. due 3 years and 9 months hence, at 4 per cent. per annum, simple interest. (30)

4. Give the formulæ for finding the fourth when any three of the following are given:—rate, time, principal, interest.

Find the compound interest on £1256 10s. for 2 years, at 3½ per cent. (40)

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. What events led to the revolution in 1688? Give dates and particulars of the revolution. (25)

2. What circumstances led to the formation of a National Debt in England? During what years or periods was it largely increased? Why? (25)

3. Make a genealogical table of the Houses of Stuart and Hanover. Say what claim the latter had to the throne of England. (25)

4. Give some account of the chief writers and soldiers of the reigns of William and Anne. (30)

Teaching.

MALES AND FEMALES.

(Answer two questions only.)

1. Write full notes of *matter* for a lesson on Adverbs; A River; Mountains; *or*, An Apple (for Infants). (20)

2. What apparatus would you use in giving a lesson on a River to the Second Standard? Explain the use of each part of the apparatus. (20)

3. What is an Abacus? How do you use it? (20)

4. Of what value is Mental Arithmetic? How often should lessons be given in it? When? (20)

END OF FOURTH YEAR.

FIRST PAPER.

(Three and a half hours allowed.)

Euclid.

MALES ONLY.

(Answer two questions, including No. 3, if you can.)

1. If a straight line be divided into any two parts, the squares on the whole line and on one of the parts are equal to twice the rectangle contained by the whole and that part, together with the square on the other part. (20)

2. If a straight line be divided into any two parts, the square on the whole line is equal to the squares on the two parts, together with twice the rectangle contained by the parts. (20)

3. The square on the excess of one straight line above another is less than the squares on the two lines by twice their rectangle. (30)

Algebra.

(Answer two questions, including Question 3, if you can.)

1. Reduce to its lowest terms:—

$$\frac{x^3 + 2x^2 - 8x - 16}{x^3 + 3x^2 - 8x - 24}$$

Find the L.C.M. and G.C.M. of $6a^3 + a^2b - 11ab^2 - 6b^3$; and $6a^3 + 11a^2b - ab^2 - 6b^3$. (20)

2. There is a number such that the square of the next higher number exceeds the square of the next lower number by 120. Find the number. (20)

3. Solve the equations:—

(*a*) $\cdot 6x - \frac{\cdot 09x - \cdot 05}{\cdot 5} = \cdot 2x + 8\cdot 9$.

(*b*) $2x + 7y = 13$; $6y - 5x = 38$. (30)

Mensuration.

(Answer one question.)

1. The radius of a circular arc is 2 ft. 11 in.; find the length of its chord. (20)

2. A rule to find the weight of a solid iron ball is:

'Multiply the cube of the diameter expressed in inches by 9 and divide by 64; the result will give the weight required in pounds.'

Assuming the truth of the above rule, find the weight in ounces of a cubic foot of iron. (20)

Arithmetic.

FEMALES ONLY.

(Answer three questions only.)

1. Find the amount of £200 16s. 8d. in 2¾ years at 3½ per cent. simple interest. (30)

2. The debts of a bankrupt amount to £2,016, and his assets to £1,764; how much do his creditors lose in the pound? (30)

3. A merchant gains 30 per cent. on one-third of his capital, 45 per cent. on one-fourth, and loses 15 per cent. on the remainder; what is his gain per cent. on the whole capital. (40)

4. If four men mow 15 acres in 10 days of 7 hours each, in how many days of 6½ hours can 7 men mow 19½ acres? (30)

Grammar.

MALES AND FEMALES.

(Answer questions 1 and 2, and two other questions.)

1. 'He stood *as erect as that* tent *prop, both arms stretched out wide*
On the great cross-support in the centre, *that* goes to *each* side.' *R. Browning.*

Analyse the above passage. (20)

2. Parse the words in italics. (20)

3. What classes of words in the English language are Saxon? Give a full answer. (20)

4. Explain nominative absolute, nominative of address, nominative in apposition; passive voice; complementary predicate; complex sentence. (20)

5. Name any three great writers of English poetry, and write a short biography of one of them. (20)

Geography.

(Answer three questions only.)

1. Why is the Atlantic coast of North America colder than the Pacific coast? (25)

2. Describe the great lakes of North America. (25)

3. What sort of a climate has Brazil? Why? Name the chief physical features of Brazil. (25)

4. What are monsoons? Where are they found? What other winds do you know anything of? (25)

SECOND PAPER.

Two hours and a half allowed.

[Needlework for Females. *One hour.*]

Arithmetic.

MALES.

(Answer three questions only.)

1. At what time between 3 and 4 o'clock is the minute hand of a watch at right angles to the hour hand? (30)

2. A square field contains 2½ acres. The cost of making a path is 1s 6d. per sq. yard. What is the cost of making a path three yards wide inside the field round the boundary? (30)

3. What rate of interest per annum does a man get for his money when in discounting a bill due in 10 months he deducts as discount 4 per cent. of the total amount of his bill? (30)

4. Define *Stocks*, *Consols*, and *Annuities*.

I invest equal sums in a Four per Cent. Stock, and in a Three per Cent. Stock, and get 5 per cent. for my money; the Four per Cents. are at 90; what is the price of the Three per Cents.? (40)

History.

MALES AND FEMALES.

(Answer three questions only.)

1. Write an account of the acquisition and loss of English possessions in France. (25)

2. What kings of England suffered a violent death? What kings were deposed?

3. Give a full account of the Reform Bill of 1832. (25)

4. What led to the Peninsular War? Who were engaged in it? What were the chief engagements, with dates? (30)

Teaching.

(Answer two questions only.)

1. Write notes of a lesson on The Tides; The Moon; Ocean Currents. (20)

2. Name and classify some of the difficulties of English spelling, with examples. Show how you overcome the difficulties in the class. (20)

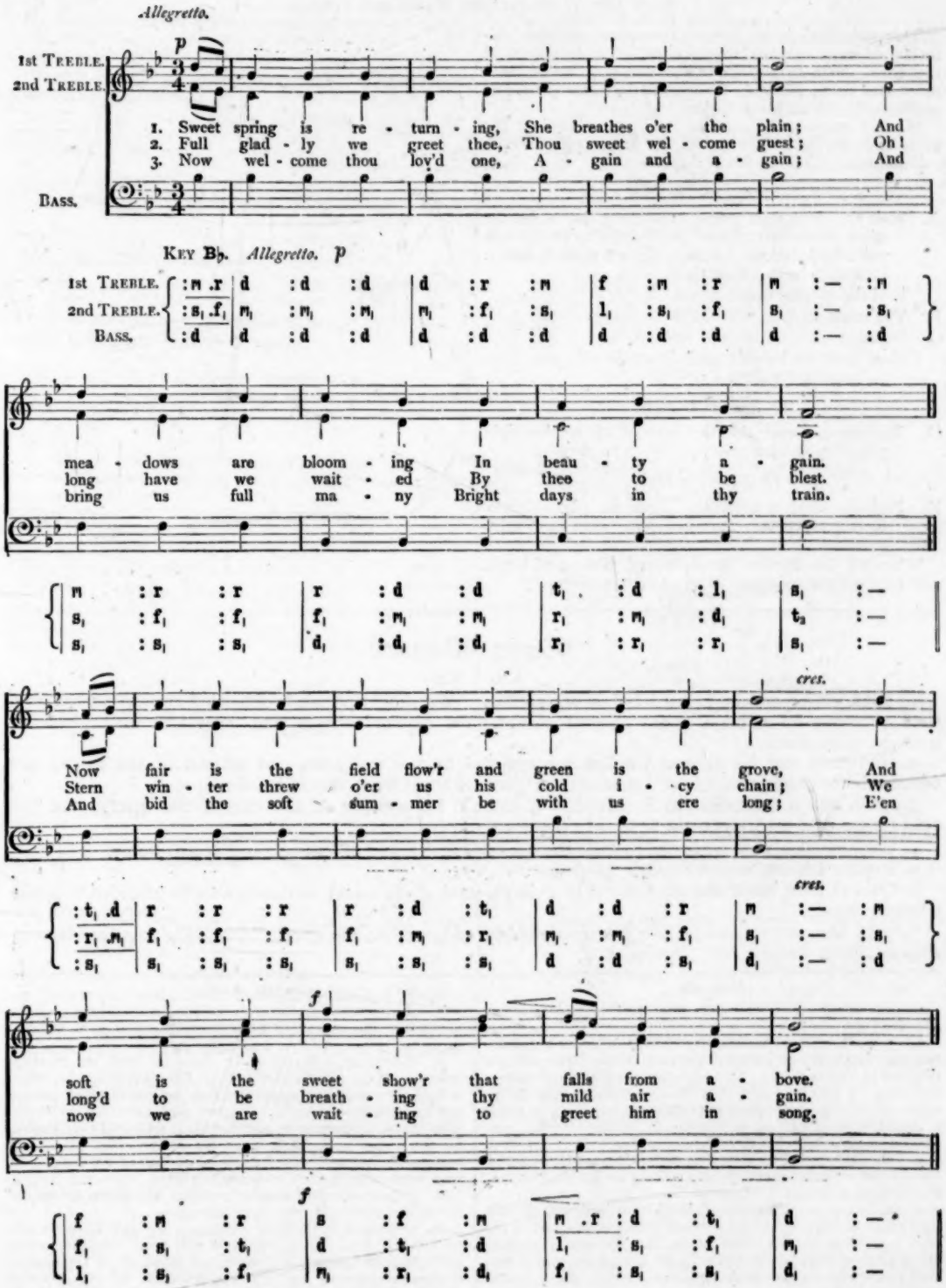
3. How do you teach writing? Compare the advantages and disadvantages of the use of head-line copybooks. (20)

FOR TEACHERS IN INFANT SCHOOLS.

1. Write full notes of a lesson on The Apple; The Bear; *or* A Letter. (20)

2. Describe a lesson in paper folding. (20)

3. How do you teach reading? (20)

SPRING.

Allegretto.
1st TREBLE.
2nd TREBLE.
BASS.
1. Sweet spring is re - turn - ing, She breathes o'er the plain; And
2. Full glad - ly we greet thee, Thou sweet wel - come guest; Oh!
3. Now wel - come thou lov'd one, A - gain and a - gain; And
KEY B♭. Allegretto.
mea - dows are bloom - ing In beau - ty a - gain.
long have we wait - ed By thee to be blest.
bring us full ma - ny Bright days in thy train.
Now fair is the field flow'r and green is the grove, And
Stern win - ter threw o'er us his cold i - cy chain; We
And bid the soft sum - mer be with us ere long; E'en
soft is the sweet show'r that falls from a - bove.
long'd to be breath - ing thy mild air a - gain.
now we are wait - ing to greet him in song.

Knitting Maps.

BY MRS. J. D. HARRIS.

NEW AND WELL-FITTING HEEL FOR STOCKING.

This new heel is a great improvement on the old-fashioned ones. By the insertion of the little gusset at the back, the actual shape of the foot is followed, and, more play being allowed, the wool is less stretched, and consequently wears much better.

We will suppose the sock or stocking reduced at the ancle to 81 stitches. Put 42 on the instep pin, 18 each side the seam stitch on the heel pin.

To commence the Heel.

A. Knit 17. Pick up a loop. (This loop should be the stitch of the last round. By increasing in this way you avoid making a hole.) Knit 1, seam 1, knit 1. Pick up a loop. Knit 17.

Purl the reverse row.

B. The same as A.

C. Ditto.

Now knit backwards and forwards till you have 10 loops at the side.

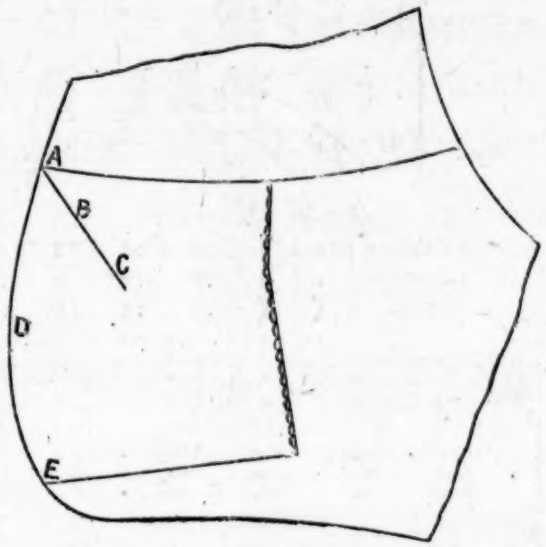
To Round the Heel.

D. Reduce once each side the seam stitch on the right side till you have only 29 stitches on the pin.

To Turn the Heel.

E. Purl 17. Purl 2 together. Turn the pin. Knit 6. Knit 2 together. Turn the pin. Purl 6. Purl 2 together.

When all the stitches are taken up, pick up 18 loops, add 4 from the instep pin. The same the other side.



Query Column.

RULES.

1. Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

*** All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher*, *Pilgrim Street, Ludgate Hill, London, E.C.*

General.

1. STUDENT.—The solution of your query appeared in our issue for July.

2. J. W. G.—Yes he was right in refusing a labour certificate to a boy who had only passed in two out of the three subjects required in Standard IV. The authority for this is of course the code. If you refer to Article 102, you will find that certificates are given to those who *reach* the standard. But to reach a standard is defined to be passing in reading, writing, and arithmetic, that is, in the three R's.

3. H. MELLOR.—You cannot do better than use Hygiene, by Dr. Carpenter, supplementing your reading as therein directed, if you want to extend it.

4. STUDENT.—(1) Your query is evidently incorrect. If both paid ready money, the stationer would gain ¼ of 100, or 11⅓ per cent. As he is allowed longer credit than the retail customer, his profit must therefore be greater; but the answer sent is less. Will you kindly forward your query again? (2) Many thanks for the solution sent.

5. X.—Yours and some others next month.

6. E. S. I. M.—See Rule 2 of the Query Column.

7. A. THORNTON.—Your query is under consideration, but it seems like proving an abstract quantity equal to a concrete quantity.

8. COUNTRY.—Your case is important, and we therefore refer you to the new Science and Art Directory, page 30, where it says, 'In order to obtain payment on the result of instruction in a subject of science, a teacher must have obtained a *first* class in the May examinations, or what is reckoned as equivalent by the Department? You must get a first class. It is only reasonable that teachers should keep abreast of the times. All who want to teach must be anxious to learn.

9. LENN.—We will enquire further. The hoods are noticed in many almanacs and books of reference.

10. SUBSCRIBER.—Second year men will not have to take mental arithmetic. The writing is only poor, exhibiting many faults in short space. You have not practised in the way we always recommend, and you ought not to be disappointed. The small hand is a little better. 60 per cent. and 70 per cent. respectively.

11. MECHANIC.—A vessel contains mercury, and over the mercury 10 inches depth of water. Find to one decimal place the pressure on a square inch at the following depths below the surface of the water.

(1) Six inches.

(2) One foot.

(3) Three feet; having given 1 foot = 1000 ounces; pressure 15 lbs. on a square inch, the density of mercury 13½ times that of water. (*Blackie's* 'Mechanics.')

Consider that the total pressure is the sum of the separate pressures.

In the first case the pressure of the air is 15 lbs. per sq. in.
And the pressure of the water is $\frac{6}{1728} \times \frac{1000}{16} = \cdot 2$,, ,,
Total 15·2 ,, ,,
In the second case the pressure of the air is 15 ,, ,,
The pressure of the water is $\frac{10}{1728} \times \frac{1000}{16}$
,, ,, mercury is $= \frac{2 \times 13\frac{1}{2}}{1728} \times \frac{1000}{16}$
The pressure of water and mercury
$= \frac{37}{1728} \times \frac{1000}{16} = 1 \cdot 3$ lbs. per sq. in.
∴ The total pressure = 16·3 ,, ,,
In the third case the pressure of air is 15 ,, ,,
That of the water and mercury together
$= \frac{26 \times 13\frac{1}{2} + 10}{1728} \times \frac{1000}{16}$
$= \frac{361}{1728} \times \frac{1000}{16} = 13 \cdot 1$
∴ Total = 28·1 lbs. per sq. in.

12. H. B.—A body projected horizontally from the top of a cliff with a velocity of 40 feet per second strikes the ground after 3 seconds; find the distance of the point of fall from the point of projection. (*Magnus.*)

$$\text{Distance} = \sqrt{(40 \times 3)^2 + (\tfrac{1}{2} \text{ f } t^2)^2} \text{ ft.}$$
$$= \sqrt{120^2 + (16 \times 9)^2} \text{ ft.}$$
$$= \sqrt{14400 + 20736} \text{ ft.}$$
$$= \sqrt{35136} \text{ ft.}$$

3'51'36 (187·44
1
28 | 251
224
367 | 2736
2569
3744 | 16700
14976
37484 | 172400
149936
22464

$= \underline{187 \cdot 44 \ldots\ldots}$ ft. Ans.

Algebra.

1. COMPOS.—When 3½ per cent. is the rate of interest, find what sum must be paid now to receive a freehold estate of £320 a year 10 years hence; having given

log 1·032 = ·0136797,
log 7·29798 = ·8632030. (*Todhunter.*)

$\text{Sum} = \frac{AR - p}{R - 1}$, (where A = annuity, R = the amount of one pound in one year, and p = time when annuity commences.)

$$= \frac{320 \left(1 + \frac{3\frac{1}{2}}{100}\right)^{-10}}{\frac{3\frac{1}{2}}{100}}$$
$$= 320 \times \tfrac{200}{7} (1 \cdot 032)^{-10}$$
$$= 10000 (1 \cdot 032)^{-10};$$
∴ Log sum = log 10000 − 10 log 1·032
= 4 − (·0136797 × 10)
= 4 − ·136797
= 3·863203
= log 7297·98;
∴ Sum = £7,297·98. Ans.

2. OSBORNE.—Write down the coefficient of x^{2r+1} in the expansion of $\left(x - \frac{1}{x}\right)^{2n+1}$. (*Todhunter.*)

$$\left(x - \frac{1}{x}\right)^{2n+1} = \frac{(x^2 - 1)^{2n+1}}{x^{2n+1}};$$

The coefficient of x^{2r+1} is the same as that of $x^{2r+1+2n+1}$ in the expansion of $(x^2 - 1)^{2n+1}$, and this is the same as the coefficient of y^{n+r+1} in the expansion of $(y - 1)^{2n+1}$.

In the expansion of $(x + a)^p$, the $(q + 1)$th term

$$= \frac{p(p-1)(p-2) \ldots\ldots (p-q+1)}{\lfloor q} x^{p-q} a^q,$$

Multiplying numerator and denominator by $\lfloor p - q$,

$$= \frac{\lfloor p}{\lfloor q \; \lfloor p - q} x^{p-q} a^q;$$

Now let us take the expression $(y - 1)^{2n+1}$, of which we wish to find the term involving y^{n+r+1};

By substitution—

$$p = 2n + 1,$$
$$p - q = n + r + 1,$$
∴ By subtraction: $q = n - r$,
And $a = -1$;
∴ Coefficient $\frac{\lfloor p}{\lfloor q \; \lfloor p - q} a^q$.

becomes $\frac{\lfloor 2n+1}{\lfloor n-r \; \lfloor n+r+1} (-1)^{n-r}$.

3. E. N.—Find the rth term of the expression $(a + x)^{\frac{1}{3}}$. (*Hamblin Smith.*)

The rth term of $(a + x)^{\frac{1}{3}}$

$$= \frac{n(n-1)(n-2) \ldots\ldots (n-r+2)}{\lfloor r-1} a^{n-(r-1)} x^{r-1}$$
$$= \frac{\frac{1}{3}(\frac{1}{3}-1)(\frac{1}{3}-2) \ldots\ldots (\frac{1}{3}-r+2)}{\lfloor r-1} a^{\frac{1}{3}-r+1} x^{r-1}$$
$$= \frac{\frac{1}{3} \cdot -\frac{2}{3} \cdot -\frac{5}{3} \ldots\ldots -\frac{3r-7}{3}}{\lfloor r-1} \left(\frac{x}{a}\right)^{r-1} a^{\frac{1}{3}}$$
$$= \frac{(-1)^{r-2} (\frac{1}{3})^{r-1} \cdot 1 \cdot 2 \cdot 5 \ldots\ldots 3r-7}{\lfloor r-1} \left(\frac{x}{a}\right)^{r-1} a^{\frac{1}{3}}$$
$$= \frac{1 \cdot 2 \cdot 5 \ldots\ldots 3r-7}{\lfloor r-1} (-1)^{r-2} \left(\frac{x}{3a}\right)^{r-1} a^{\frac{1}{3}}.$$

Arithmetic.

1. JEAN.—A man aged 45 has a pension of £300 a year during his own life; he wishes to exchange it for another to continue not only during his life, but that of his wife, aged 40. What will be this pension reckoning compound interest at 5 per cent.?

This question is taken from Chambers' Arithmetic, and the following solution is given in the key.

$$\text{Pension} = \frac{a_{45} \times 300}{a_{45} + a_{40} - a_{40 \cdot 45}};$$

From Table 6 (page 274), 5 per cent. column—
Value of £1 on a single life at 40 is 13·390,
,, ,, 45 ,, 12·648;
From Table 7 (page 275), for two lives at 5 per cent.—for 40 and 45 (look at 45)—
Value of £1 is 10·598.
Working now from formula above,

$$\text{Pension} = \frac{a_{45} \times 300}{a_{45} + a_{40} - a_{40 \cdot 45}}$$
$$= \frac{12 \cdot 648 \times 300}{12 \cdot 648 + 13 \cdot 390 - 10 \cdot 598} £$$
$$= \frac{3794 \cdot 4}{26 \cdot 038 - 10 \cdot 598} £$$
$$= \frac{3794 \cdot 4}{15 \cdot 44} £$$
$= \underline{£245 \text{ 15s. } 0\tfrac{1}{2}\text{d.}}$ Ans.

2. FOLKESTONIAN.—Simplify

$$\frac{2 \times \sqrt{1+\frac{1}{3}} \div \sqrt{1-\frac{1}{3}}}{5 \times \sqrt{1+\frac{1}{3}} \times \sqrt{1-\frac{1}{3}}}$$

First Method.—

$$\frac{2 \times \sqrt{1+\frac{1}{3}} \div \sqrt{1-\frac{1}{3}}}{5 \times \sqrt{1+\frac{1}{3}} \times \sqrt{1-\frac{1}{3}}}$$

$$= \frac{2 \times \sqrt{\frac{4}{3}} \div \sqrt{\frac{2}{3}}}{5 \times \sqrt{\frac{4}{3}} \times \sqrt{\frac{2}{3}}}$$

$$= \frac{2 \times \sqrt{\frac{4}{3} \times \frac{5}{3}}}{5 \times \sqrt{\frac{8}{3}} \times \frac{2}{3}}$$

$$= \frac{2 \times \sqrt{\frac{8}{9}}}{5 \times \sqrt{\frac{16}{9}}}$$

$$= \frac{2}{5} \times \sqrt{\frac{5}{3} \times \frac{15}{16}}$$

$$= \frac{2}{5} \times \sqrt{\frac{75}{48}}$$

$$= \frac{2}{5} \times \frac{5}{4}$$

$$= \frac{1}{2}. \quad \text{Ans.}$$

Second Method.

$$\frac{2 \times \sqrt{1+\frac{1}{3}} \div \sqrt{1-\frac{1}{3}}}{5 \times \sqrt{1+\frac{1}{3}} \times \sqrt{1-\frac{1}{3}}}$$

(Dividing numerator and denominator by $\sqrt{1+\frac{1}{3}}$)

$$= \frac{2 \div \sqrt{\frac{2}{3}}}{5 \times \sqrt{\frac{2}{3}}}$$

$$= \frac{2}{5 \times \sqrt{\frac{2}{3}} \times \sqrt{\frac{2}{3}}}$$

$$= \frac{2}{5 \times \frac{2}{3}}$$

$$= \frac{3}{5}$$

$$= \frac{1}{2}. \quad \text{Ans.}$$

3. PERPLEXED.—A tradesman increased his estate annually a third part, abating £100 which he spent on his family, and at the end of $3\frac{1}{2}$ years he found that he was worth £3,179 11s. 8d.; how much had he at the beginning? (*Gray's* 'Arithmetic.')

Gain in a year = $\frac{1}{3}$ of capital,
Amount at end of year = $\frac{4}{3}$ of capital,
∴ Capital = $\frac{3}{4}$ of amount at end of year.
Gain in $\frac{1}{2}$ year = $\frac{1}{6}$ of $\frac{1}{3}$ of capital
= $\frac{1}{18}$ of capital,
Amount at end of $\frac{1}{2}$ year = $\frac{19}{18}$ of capital,
∴ Capital = $\frac{18}{19}$ of amount at end of $\frac{1}{2}$ year.

£	s.	d.	
3179	11	8	= Amount at end of $3\frac{1}{2}$ years
		12	
13)38155	0	0	
£2935			
25			= Expenses for $\frac{1}{2}$ year
2960			= Amount at end of 3 years
3			
4)8880			
£2220			
100			= Expenses for a year
£2320			= Amount at end of 2 years
3			
4)6960			
1740			
100			= Expenses for a year
1840			= Amount at end of a year
3			
4)5520			
1380			
100			= Expenses for a year
£1480			= Amount at the beginning.

4. N. S. G. H.—The interest on a certain sum of money for a certain time is £28, and the discount on the same sum for the same time is £21 17s. 6d. Find the sum. (*Hamblin Smith.*)

The difference between the simple interest and the discount is the simple interest on the discount.

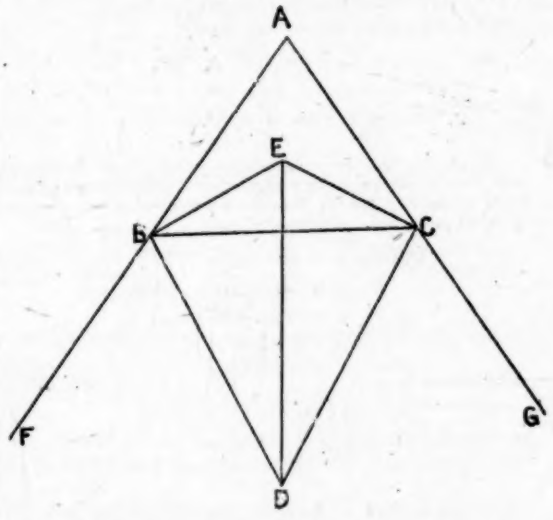
Difference = £28 − £21 17s. 6d.
= £6 2s. 6d.;

£		£		£		
6$\frac{1}{8}$	:	28	::	21$\frac{7}{8}$	:	Sum.
8		4		8		
49				175		
7				25		

∴ Sum = £100. Ans.

Geometry.

1. GRACIAS A DIOS.—ABC is a triangle, and the exterior angles at B and C are bisected by the straight lines BD, CD respectively, meeting at D; show that the angle BDC together with half the angle BAC make up a right angle. (*Todhunter.*)



Produce AB to any point F, and AC to any point G.

Bisect the angles CBF, BCG by the straight lines BD, CD meeting at D.

Bisect the angles ABC, ACB by the straight lines BE, CE meeting at E. Join ED.

Proof.—∠ EBC = half ∠ ABC,
∠ DBC = ,, ∠ FBC,
∴ ∠ EBD = ,, ∠s ABC, FBC
= ,, of 2 right angles; (I. 13.)

Wherefore ∠ EBD is a right angle.

Similarly it can be proved that ∠ ECD is a right angle.

Again, ∠s BEC, EBC, ECB = 2 right angles, (I. 32.)

∴ ∠ BEC together with $\frac{1}{2}$ ∠ ABC and $\frac{1}{2}$ ∠ ACB = 2 right angles;

Now, ∠ EBD is a right angle,

∴ ∠s BED, EDB = a right angle, (I. 32.)

Wherefore ∠s BEC, BDC are together equal to two right angles;

∴ ∠s BEC, BDC = ∠BEC + $\frac{1}{2}$ ∠ ABC + $\frac{1}{2}$ ∠ACB, (Ax. 1.)

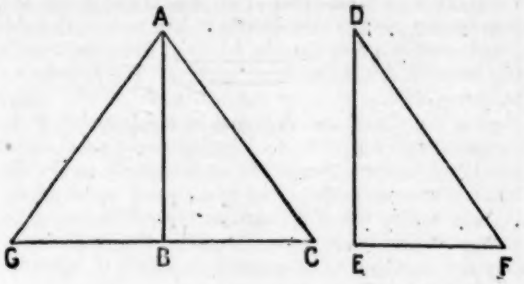
Wherefore ∠ BDC = $\frac{1}{2}$ ∠ ABC + $\frac{1}{2}$ ∠ ACB; (Ax. 3.)

Adding $\frac{1}{2}$ ∠ BAC to each of these;

∴ ∠ BDC + $\frac{1}{2}$ ∠ BAC = $\frac{1}{2}$ ∠ ABC + $\frac{1}{2}$ ∠ ACB + $\frac{1}{2}$ ∠ BAC, (Ax. 2)
= $\frac{1}{2}$ of 2 right angles
= a right angle.

Q. E. D.

2. H. B.—Two right-angled triangles have their hypotenuses equal, and a side of one equal to a side of the other; show that they are equal in all respects. (*Todhunter.*)



Let ABC, DEF be two triangles, having the angles B and E right angles; also let AC be equal to DF, and AB equal to DE. Then the triangles ABC, DEF shall be equal in all respects. Produce CB to G, making BG equal to EF, and join AG.

Proof.—In the triangles ABG, DEF,

sides AB, BG = sides DE, EF,

and $\angle$ ABG = a right angle (I. 13.)

$= \angle$ DEF;

$\therefore$ the triangles are equal in all respects. (I. 4.)

Now, AC = DF, (Hyp.)

and AG = DF;

$\therefore$ AC = AG,

and $\angle$ ACG = $\angle$ AGC, (I. 5.)

and angles ABC, ABG are right angles;

$\therefore$ Triangles ABC, ABG are equal in all respects. (I. 26.)

But the triangles ABG, DEF have been proved to be equal in all respects;

$\therefore$ Triangles ABC, DEF are equal in all respects.

Q. E. D.

Science Notes.

A TEXT Book of Practical Organic Chemistry, by Chapman Jones, F.I.C., F.C.S., &c., Demonstrator of Practical Chemistry at the Normal School of Science, and Royal School of Mines. A new edition (the third) of the above work having been called for, the opportunity has been taken of making a thorough revision to bring it into complete accord with the present syllabuses of the Department of Science and Art and of the University of London. At the same time a few changes have been carried out which experience has shown to be desirable in making the amount of work set down to be done more suitable to the time and abilities of the average student. As the book at present stands, the first part is a course suitable for students that are preparing for the Elementary Examination of the Department of Science and Art, and the second part gives the reaction and methods of analysis required for the advanced stage. The third part deals with those substances that are given for detection at the final B.Sc. Examination of the London University, except so far as they are included in the previous pages of the book.

In the experience of some of our best teachers, there is no volume on this subject in which such a practically useful selection of reactions is to be found so concisely and clearly described, and it is hoped that the improvements made in the forthcoming edition will not only enhance its value in the eyes of those who have been accustomed to use it, but secure the patronage of others who have not already had the opportunity of examining the work for themselves.

***

WE learn from 'Nature' that Mr. Fletcher, of Warrington, has invented a new compressed oxygen furnace. In this furnace diffusion of the heat, which was the great difficulty in former attempts to use oxygen for this purpose, is secured by using a fine jet of Brin's compressed oxygen directed centrically into one end of a tube a quarter of an inch in bore, open at both ends, the oxygen jet acting as an injector, and drawing with it from four to five times its bulk of air. This tube, containing the mixture of oxygen and air, is used as the central part of an ordinary blowpipe of heavy cast iron, which is placed close up against the burner opening of one of Fletcher's ordinary injector furnaces, lined with refractory material. The power of the furnace depends entirely upon the quantity of oxygen and gas supplied, and can be adjusted to any temperature, from a dull red to that sufficient to an exceedingly high one. The special advantages of the apparatus are that it is entirely self-acting, requires no attendance, and that it greatly increases the range of temperatures which can be obtained by a simple apparatus.

***

Mr. HOCLING, writing from Adelaide, gives a description of a new Australian mammal. It is an underground burrowing animal, resembling somewhat the Cape mole in its general appearance, but differing in many respects. The total length is 13 inches, no eyes visible, and no external ears. It was found on the overland line from Adelaide to Port Darwin. The collector reports that it must be of rare occurrence, as on questioning the aborigines of the locality, there was only one individual who had seen it before, and then only upon a single occasion.

***

THE Committee of the British Association, which was appointed to inquire into the teaching of Chemistry, have made a report. The first conclusion is that Chemistry should be taught in schools, first and mainly, on account of the mental training it affords, and secondly, for the sake of its application and its direct bearing on the facts of everyday life. The chief difficulties are then stated. These are believed to be—(1) defective organization and considerations of expense; (2) the lower value attached to chemistry in comparison with other subjects of the school curriculum; (3) the small amount of time which is devoted to the subject; (4) the necessity of preparation for various kinds of examinations; (5) the absence of good text books; (6) the dearth of properly qualified teachers. The Committee are to continue their labours. It cannot be denied that there is some truth in all these statements, and a good deal of it in a few of them. The chemists, however, do not seem to have apportioned any part of the blame directly to themselves. Some certainly, and possibly several of those present, were responsible for most of the examination questions set, and what is much more important, for the requirements upon which they were based. If it is well that these requirements should be drawn up, it cannot be

wrong if they are adhered to. If the teacher is pressed for time, and can only cover a limited field, is it not best that he should attend to what eminent chemists have mapped out, and to such aspects of it as by their questions they think most important? The chemists must make their choice. Either they must give more liberty, and allow teachers to teach what they like, and in the way they best can, or else they must be content with the sort of results they get now. If the results are wrong, it is more the fault of the system than the teachers.

***

THOSE of our readers who are interested in photography will be glad that their attention has been called to an excellent manual on the subject. It is called 'An Introduction to the Science and Practice of Photography,' by Mr. Chapman Jones. Those who have at any time had the advantage of Mr. Jones's instruction will know what to expect. Those who have not will be pleased that we have directed their notice to this book.

***

THE School of Art Wood-carving, City and Guilds Institute, Exhibition-road, South Kensington, has been re-opened after the usual summer vacation, and we are requested to state that one or two of the free studentships in the evening classes, maintained by means of funds granted to the school by the institute, are vacant. To bring the benefits of the school within the reach of artisans, a remission of half-fees for the evening class is made to artisan-students connected with the wood-carving trade. Forms of application for the free studentships, and any further particulars relating to the school may be obtained from the manager.

***

THERE seems to be something contagious in the splendid generosity recently exhibited by some of the wealthy companies of individuals. Only a short time ago the Goldsmiths' Company offered the munificent bequest of £85,000 to found a Technical School at New-cross, and now the Mercers' Company have made another handsome offer of the same kind. This is what educationists have long been wishing for. There can be no possible doubt but that institutions thus founded will prove much better for the special needs of the districts than institutions founded and regulated by the State.

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Oral Teaching: The Preparation of Lessons and of Notes of Lessons.

BY JOSEPH H. COWHAM, F.G.S.,

Master of Method: Westminster Training College.

Answers:— Kinds, and the Educational value of each.

1. **The Simultaneous Answer.**—There are two conditions of oral teaching in which the simultaneous answer is admissible and indeed valuable: the first is when information has been supplied either by the teacher or some member of the class, and the group of scholars is required simply to repeat what they have been told; the second is when by a series of preliminary teaching processes—by statement, by illustration, and by conversational exercises between the teacher and his pupils, the latter have been led, step by step, to the establishment of a new truth; this new knowledge may then be received from the class in the form of a simultaneous answer. The former is a teaching device whereby the attention of the entire class is stimulated and the memory is exercised by the simple effort of repetition; its educational effect is not great and hence it should not be frequently used: the latter, when successful, is an educational result of the highest value, bringing into exercise the powers of connected and continuous thought in the processes of comparison which it engages and the efforts of inference which it demands.

This highest result can only be expected where the members of the class are nearly equal in attainment, where the teacher is skilled in his art and has complete control over the attention and the thought of his class. The use of this method of reply under less favourable conditions, viz., with classes made large by the admission of children of varied attainments; by teachers who are only as yet acquiring the teaching art, and under a system which requires a large amount of effort to be bestowed upon the dull and slow, is deservedly subject to much adverse criticism; but with the multiplication of large classes of children of equal ability and the increased employment of trained teachers the simultaneous method may become more widely adopted. Whether the simultaneous answer be retained or not the value of the educative processes upon which it is sought to be based cannot be denied, for no teacher is content in his attempts at oral teaching with less than the power completely to direct the entire thought of his class towards the acquisition of the knowledge which he is prepared to impart. When this is accomplished it matters little whether the statement which follows the successful teaching effort be an answer by one or by many tongues.

The following is a full description of a simultaneous answer, and the process by which it may be secured together with its educational effects as these were understood by those who practised the Stow or Glasgow system of oral teaching:—

A **simultaneous answer** is one given by all or nearly all of a class **as the result of a previous educative process.**

> Where this process has not been gone through the answer is merely indiscriminate, how few or how many soever have united in giving it; and its value is comparatively small. It is to answers such as those defined above that Mr. Stow refers when he speaks of the process of 'picturing out in words' being conducted by answers **chiefly simultaneous but occasionally individual.**

How this Simultaneous Answer is Obtained:

1. Questions are addressed to a class of various degrees of difficulty. If a question refers to something familiarly known, either from the children's observation or as the result of previous teaching, it may possibly be answered by all, but is not to be regarded as a simultaneous answer in the sense now intended. On the other hand it may refer to something entirely new and be answered by none.

> These extremely easy and extremely difficult questions are not without their use. They may serve to guide the current of thought into those channels

into which the teacher desires it to flow; they may also serve to introduce a new topic or to recall new knowledge to be again made use of; or, on the other hand, the too difficult question may serve to show the teacher the limits and extent of the children's knowledge.

Between these extremes a question of any degree of difficulty may be asked.

2. **This question constitutes the first step in the educative process** by which the simultaneous answer is to be obtained. The answer given to such a question will be an indiscriminate one, and the teacher should resort to any device at his command which will encourage the children to attempt a reply.

The chief purposes which such answers as these serve are to keep the advanced and brighter members of the class active, to encourage thought amongst them, to promote a kindly form of emulation, and to carry on the process of instruction in a manner more interesting to the children than could be done by stating each successive point in the lesson as a separate proposition. In most cases, if the questions are not unreasonably difficult, perhaps an answer will be got from half-a-dozen children. This answer may be right or wrong, and must be dealt with accordingly.

In either case the second part of the process now begins, and the purpose of it is to correct what is erroneous, to complete what is partial in the children's knowledge, and to render the information and thought of the few the property of all. Merely allowing the children a little more time to dwell upon what has just been brought before them is sometimes sufficient. This may be done by simply inverting the answer given, and by making an ellipsis for the children to fill up, or by asking the question again in simpler form, taking care to avoid an unvaried repetition of the original question.

This process of simplifying terms, of allowing time, of varying the mode of presenting a question, is in itself an educative one, though of a very simple kind. If it is found to succeed, and an answer got from all, or nearly all, the purpose is answered, and the teacher may proceed to the next point in the lesson. But if this prove insufficient, a condition of things easily told by the sparseness of the answers, then—

The Third Stage of the process begins in which the teacher resorts to a process of exposition in which familiar illustration of the topic under consideration must be employed. The illustration may be comparisons stated verbally, the exhibition of a picture, or the use of a diagram, &c.

It should here be observed that failure at this stage is frequently due to the illustration used being familiar enough to the teacher but not equally so to the class; or it arises from the illustration being taken from a text book, and not fully assimilated by the teacher's own intelligence. Having by this process simplified the topic; turned it over before the minds of the children, and presented it in various aspects to the pupils' thought—if in this way the teacher has been successful, then the knowledge at first possessed by a few has become the property of all, and we at once arrive at—

The final stage of the process, viz., the simultaneous answer properly so called. The teacher reverts to the point originally started and answered first indiscriminately; he presents it again in the form of a direct question, and the answer ought now to be given by all, or nearly all, the children under instruction. The degree in which this is obtained is the test of success in the previous parts of the process, particularly the illustrative portion of it.

If the process has failed what is to be done? Obviously, however great may be the demand on the teacher's patience, the illustrative work must be done again, and its success again tested in the manner described. Practically, however, with a teacher of moderate skill this does not often occur. Every successful point in a lesson which is felt to be important should be thus brought out by an answer spread as widely over the class as possible. In this way the new matter taught becomes fixed, and the lesson is most effectively prevented from degenerating into a lecture.

When the simultaneous answer has been successfully obtained we shall then find a use for individual answering. It is only in comparatively rare cases that absolutely every child can be got to answer with all the rest, by any amount of teaching skill; children are always to be found who from constitutional dulness or habitual idleness cannot be induced to keep pace with their school fellows; of course every teacher knows where to look for these in his own school, and after every simultaneous answer it would be well that one or more of these backward children should have his attention quickened and tested by an individual question. If in addition to these he should now and then select others less markedly deficient or, even more rarely, some of the more advanced scholars, the result could not fail to be beneficial. The teacher will by these means be saved from making too high an estimate of the bright and intelligent scholars and will at the same time frequently discover where he needs to be more exact or more lucid even for these advanced scholars.

An Admixture of Individual and Simultaneous Answers is best. Children who have followed the processes of thought by which a definite mental result has been reached, are sufficiently rewarded if they are permitted to state this result in language before their school fellows; further, this statement establishes more firmly the knowledge acquired, and tends to make it a permanent possession. Where, however, the simultaneous answer is not encouraged at all, but the process of training just detailed is successfully used, the children who are anxious to show their knowledge need sometimes to be corrected for supplying answers before being asked. Frequent corrections of this kind tend to discourage effort, and the pupil is apt to feel disappointed if at every stage in which he has successfully worked, other pupils are permitted to exhibit their knowledge, whilst his ability and industry remain without such public recognition. On the other hand unless a teacher possesses superior skill in teaching, and remarkable power of control joined to a very thorough apprehension of the knowledge and ability of the members of his class, the abundant use of the simultaneous answering is very likely to deceive him in his estimate of the number of his scholars engaged in earnest effort, and to afford the means by which the dull and indolent may remain in that condition.

The wise course appears to be that which avoids anything approaching the exclusive use of either the simultaneous or the individual mode of answering, and one which whilst it demands sufficient individual replies from the slow to spur them to the necessary effort, and from the quick in order to afford them the opportunity of setting a worthy example to the rest, at

the same time retains some answers to be attempted by all, so that every child may feel that he has taken an active, if not a prominent share in announcing the results of his effort during the lesson.

Elliptical Answers.—Disapproval has already been expressed in these chapters of an extensive use of these answers on the ground that they do not encourage sufficiently complete utterances to thought; to this fault may be added the inducement they offer for guessing, and giving answers which the immediate context suggests, rather than the whole sequence of thought demands. They are especially useless when they are degraded to half word replies. All that can be said in their favour is well stated as follows by Currie:—

> 'Some use this kind of answering more than others; the ardent and sympathetic teacher uses it most, and succeeds best with it. He carries his pupils along with him, identifies his mental action with theirs, and withdraws his assistance just before the end, trusting that the impetus he has given them will carry them to the completion. It contributes remarkably to keep up the continuity of thought in a lesson. Altogether, the use of elliptical answers makes a lesson smoother and more flowing in its progress.'
>
> The following is an example of both good and bad elliptical forms of reply. By means of a paper model a teacher had led his class to see that $\frac{3}{4}$ of the paper strip was equal to $\frac{1}{2}$ of it. The two fractional expressions were placed on the board, thus, $\frac{1}{2} = \frac{3}{4}$. The teacher then asked the following question: 'What must I do to the fraction $\frac{1}{2}$ to make it $\frac{3}{4}$?' 'Multiply,' said one in reply. 'Yes, I must multiply,' said the teacher, 'but cannot you tell me what I must multiply?' The children hesitated, and in order to help them the teacher threw his question into the elliptical form, and said, 'In order to obtain the fraction $\frac{3}{4}$ from $\frac{1}{2}$ I must multiply its numerator and denominator by the same num(ber).' The useful answer is the part of the sentence underlined, the portion of the word in brackets is useless as an answer.

Remaining Modes of Reply.

1. When in doubt as to the number who may be able to give an answer, the children should show ability to answer by show of hands.

> Do not continue to ask for answer one after another beyond two of those who can reply. The children are apt to think the answers previously supplied are wrong, and hence to change their reply.

2. If the answers are for purposes of revision it is well to receive them from all parts of the class, and sometimes to select an entire row of children to reply in turn.

> This is especially stimulating to scholars who are apt to count upon their chances of being overlooked. These do not wish to be exposed as the only ignorant pupils in the class.

3. Children known to be backward and to need stimulus should receive frequent attention and be often prompted to reply.

> It is not well to ask for a show of hands and then habitually to neglect these replies in order to require those who cannot answer to make the attempt. Sometimes this mode of taking replies is allowable, but not often.

Mutual Questions and Answers. There is no doubt that when a class is under effective control this method of conversation is of excellent use in affording variety of exercise, in cultivating a power of full and complete expression, and in rousing the scholars to concentration of effort, first in shaping the question and subsqueently in receiving the answer. The contention that this method leads to childish vanity is made either by those who have had no opportunity of trying the method on a large group of children, and hence are mere theorists, or by those who have failed in the use of it because their power of direction was such that their pupils could not be entrusted with this liberty without abusing it.

(To be continued.)

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Publications Received.

G. BELL & SONS.—Practise and Help in the Analysis of Sentences (*Mason*).

BLACKIE & SON.—The Century Readers, Primers I. and II., Infants, Nos. 1, 2, and 3; When I was a Boy in China (*Yan Phou Lee*); The Brig 'Audacious' (*Alan Cole*); The Lion of St. Mark (*G. A. Henty*); Hugh Herbert's Inheritance (*C. Austin*); The Cat of Bubastes (*G. A. Henty*); Susan (*Amy Walton*); Swiss Stories (*Lucy Wheelock*); Linda and the Boys (*C. S. Lowndes*); The Battlefield Treasure (*F. Bayford Harrison*); Joan's Adventures (*A. Corkran*); Filled with Gold (*J. Perrett*); Edwy (*A. Lyster*); A Series of Fourpenny Reward Books; Little Lady Clare (*E. E. Green*); Under False Colours (*Sarah Doudney*); Storied Holidays (*Brooks*); Under Hatches (*Frankfort Moore*); In the Summer Holidays (*Jennett Humphreys*); How the Strike Began (*Leslie*); Tales from the Russian of Mdme. Kubalensky; Cindrella's Cousin; Their New Home (*A. S. Fenn*); Janie's Holidays (*C. Redford*); Dew (*M. Wilson*); The Old Violin (*J. Lockart*); Mischievous Jack (*A. Cockran*); The Twins (*L. E. Tiddeman*); Pet's Project (*C. Langton*); The Chosen Treat (*C. Wyatt*); The Queen of Squats (*J. Hornibrook*); Shucks (*E. Leslie*); Sylvia Brooke (*M. H. M. Capes*); The Little Cousin (*A. S. Fenn*); In Cloudland (*Mrs. Musgrave*); Self Exiled (*J. A. Stewart*); Gianetta (*Rosa Mulholland*); Captain Bayley's Heir (*G. A. Henty*); Play in Work and Work in Play (*John Hassell*); Outlines of Natural Philosophy (*Everett*).

CASSELL & CO., LIMITED.—The Black Arrow (*R. Louis Stevenson*); The True Glory of Woman (*Landels*); Little Folks; Bo-Peep; Marine Painting (*Walter W. May*); Cassell's Book of Sports and Pastimes.

THE CAMBRIDGE UNIVERSITY PRESS.—Elementary Commercial Geography (*Hugh Robert Mill*).

W. & R. CHAMBERS.—Great Thinkers and Workers (*R. Cochrane*); Elementary Physiography (*Findlater*).

THE CLARENDON PRESS.—Vocabulary to Xenophon's Anabasis (*J. Marshall*).

CURWEN & SONS.—Cantata: Evangeline (*J. Graham*); Cantata: Daisy Dell (*Edmund Rogers*).

DEAN & SON.—Clarkson's Musical Pictures.

HODDER & STOUGHTON.—Vermont Hall (*M. A. Paull*).

LONGMANS & CO.—Introduction to Practical Inorganic Chemistry (*Jago*); Longmans' Handbook of English Literature, Part I. (*McWilliam*); Longmans' Junior School Arithmetic.

MACMILLAN & CO.—Examples in Physics (*D. E. Jones*); A Latin Reader for the Lower Forms in Schools (*H. J. Hardy*); Easy Exercises in Greek Accidence (*H. G. Underhill*); Stories and Legends (*F. H. Colson*); First Greek Grammar (*W. Gunion Rutherford*); Elementary Statics (*J. B. Lock*).

T. MURBY.—Dr. Dick's Historical and Commercial Geography and Atlas.

THE NATIONAL SOCIETY.—Silver Star Valley (*M. Bramston*); To Horse and Away (*F. M. Peard*); Starwood Hall; Reuben Everett (*C. R. Coleridge*); St. Helen's Well (*M. H. Debenham*); Carried Off (*Esmé Stuart*); Our New Mistress (*Charlotte M. Yonge*); Mrs. Dimsdale's Grandchildren (*M. and C. Lee*).

T. NELSON & SONS.—The Royal Upper Class Readers—Simple History of English Literature (*A. L. Stronach*).

G. PHILIP & SON.—Code Wrinkles (*Richardson*).

RELF BROS.—The Universal Parsing Book (*Deakin*); An Assistant to the Board of Trade Examinations (*Forbes*); Easy Lessons on Light (*Adams*); The Charterhouse Oxford and Cambridge Atlas.

SMITH, ELDER & CO.—The Cornhill Magazine, November.

SWAN SONNENSCHEIN & CO.—The Student's Pestalozzi (*Russell*); The Cyclopædia of Education, Part 9.

T. FISHER UNWIN.—The Story of the Nations—Mediæval France (*Gustave Masson*); The Century Magazine, November.

WILLIAMS & NORGATE.—French Composition through Lord Macaulay's English—Frederic the Great, with Notes (*James Boïelle*).

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My Scholarship Answers.

BY JAMES WILLIAMS,

FRATTON STREET BOARD SCHOOL, PORTSEA.

(*First on the Scholarship List, 1888.*)

MALE CANDIDATES.

Arithmetic.

(Three hours allowed for this paper.)

1. (*a*) Subtract 107 from 305, clearly explaining the process, as to a class of young children.

(*c*) Prove the rule for finding a vulgar fraction equivalent to ·34$\dot{5}$.

(*d*) Define compound interest, stocks, proportion, mean proportional, with examples.

(1) (a)
$$\begin{array}{r} 305 \\ 107 \\ \hline 198 \end{array}$$

We cannot take 7 from 5, because 5 is less than 7. Add 10 to top figure, 10 and 5 = 15. 15 − 7 = 8. Set 8 in answer space. Having given the top line 10 extra we must add 10 also to the lower line, at the next figure, the 0. In this row 1 will mean 10, so add 1. 0 + 1 = 1. 1 from upper figure, the 0, we cannot take. As before add ten to upper figure, 10 + 0 = 10. 1 from 10 = 9. Set 9 in line. As before we shall have to add 10 to the next bottom figure, 10 being represented there by 1. 1 + 1 = 2. 2 from 3 = 1. Set down 1. Ans. = 198.

(c) The dec. = ·3454545
dec. × 1000 = 345·4545 I.
dec. × 10 = 3·4545 II.
Subtract II. from I. then 990 times the dec. = 342.

$$\therefore \text{The dec.} = \frac{342}{990} = \frac{345 - 3}{990} = \frac{19}{55}$$

i.e., Take the unrecurring figures from the whole decimal and the remainder is the numerator of the fraction; the denominator = a '9' for every recurring figure, followed by a '0' for each unrecurring figure. The fraction thus formed to be brought to its lowest terms.

(*d*) *Interest* = Sum paid for the loan of money. Thus, if I borrow £100 and pay £3 for the use of it; £3 = the Interest.

Compound Interest. That kind of Interest which, as it becomes due, is added to the Principal (*i.e.*, the money lent), and the Interest for the next period is calculated on this increased sum. Thus if I have £100 at £10 per cent.; I pay £10 for the first year and the same every year, at *Simple* Interest; but at *Compound* Interest the £10 would be added to the £100, = £110 and the second year's Interest would be £11 instead of £10.

Stock = (*a*) The working capital of trading companies;
(*b*) The funded debt of a state.

Thus if I am a fund-holder in the 'Three Per Cent. Consols,' or have shares in a Railway Company or other commercial concern, I possess *stock*.

Proportion = the equality of two ratios. *Ratio* is the magnitude of one quantity in comparison with another of the same kind. Thus the ratio of 5 cows to 7 cows = $\frac{5}{7}$, the first being $\frac{5}{7}$ of the second; the ratios of 10 cows to 14 cows, 15 days to 21 days, are similarly expressed:—$\frac{10}{14}$, $\frac{15}{21}$. These fractions it is clear = $\frac{5}{7}$. Then we say that 5, 7, 10, 14 form a *proportion*, symbolically expressed—$\frac{5}{7} = \frac{10}{14}$, or 5 : 7 :: 10 : 14.

Mean Proportional = the number which forms the numerator of one fraction and the denominator of the other fraction in a proportion, thus:—$\frac{3}{6} = \frac{6}{12}$ or 3 : 6 :: 6 : 12. Here 6 is a mean proportional.

2. A man laid out £14 5s. 9d. on gloves, at 2s. 3d. the pair; some of them faded, and were unsaleable; the rest he sold for £18 11s. 3d at 3s. 4½d. the pair. How many pairs faded?

(2) No. of pairs bought = $\frac{£14\ 5s.\ 9d.}{2s.\ 3d.} = \frac{11413}{90} = 127$ pairs.

,, ,, sold = $\frac{£18\ 11s.\ 3d.}{3s.\ 4\frac{1}{2}d.} = \frac{14925}{270} \times \frac{3}{11} = 110$ pairs.

,, ,, faded = 127 − 110 = 17 pairs. Ans.

5. On a rock are three revolving lights: one revolves in 2 m. 12 sec., another in 3 m. 7 sec., the third in 3 m. 24 sec. I saw them all bright at midnight. When will they next be so?

(5) Required time = L.C.M. of 132, 187, 204
= L.C.M. of 11 × 12, 11 × 17, 12 × 17
L.C.M. = 11 × 12 × 17 = 2244 sec. = 37 min. 24 sec.
37 min. 24 sec. after midnight. Ans.

7. A rectangle 363 feet long covers ·0003125 of a sq. mile. How wide is it?

(7) $\cdot 0003125m = \frac{3125}{10000000} = \frac{1}{3200}\ m = \frac{528 \times 528}{32}$ ft.

Length × breadth = $\frac{528 \times 528}{32}$ sq. ft.

breadth = $\frac{528 \times 528}{32 \times 363} = \frac{24}{}$ ft. Ans.

8. If the rent of 420 acres be £1,621 8s. 4½d., how many acres (at the same rate per acre) would be rented for £1,389 15s 9d.?

(8) £1,621 8s. 4½d. = 32428½s. = $\frac{64857}{2}$s.
£1,389 15s. 9d. = 27795½s. = $\frac{111183}{4}$s.
No. of ac. rented for $\frac{64857}{2}$s. = 420

,, ,, ,, 1 = $\frac{420 \times 8}{259427}$

,, ,, ,, $\frac{111183}{4} = \frac{420 \times 8 \times 111183}{259427 \times 4}$

$= \frac{420 \times 2 \times 3}{7} = \frac{360}{}$ acres. Ans.

9. A man divides £504 amongst his three sons, whose ages are 19, 21, and 23, in sums proportional to their ages. Three years afterwards he similarly divided an equal sum. How much did each receive in all?

(9) *First sharing.* No. of shares = 19 + 21 + 23 = 63
A gets $\frac{19}{63}$ of £504 = 23 × 8 = £184
B ,, 21 × 8 = £168
C ,, 19 × 8 = £152
Second sharing. No. of shares = 22 + 24 + 26 = 72
A gets $\frac{22}{72}$ of £504 = 26 × 7 = £182
B ,, 24 × 7 = £168
C ,, 22 × 7 = £154
Totals.
A = 184 + 182 = £366
B = 168 + 168 = £336
C = 152 + 154 = £306
} Answer.

10. A square chess board contains 64 equal squares, and the area of each square is 1·3225 sq. in. The rim running round the board is two-fifths of an inch wide. Find the length of the board's side.

(10) Area of inner square = 1·3225 × 64 sq. in
Side of inner square = $8\sqrt{1\cdot3225} = 8 \times 1\cdot15$ in. = $9\frac{1}{5}$ in.
To this add twice the rim; then outer edge = $9\frac{1}{5} + \frac{2}{5} + \frac{2}{5} = 10$ in. Ans.

11. A sold a horse to B, gaining $7\frac{1}{2}$ per cent. on what it cost him; B sold it to C for £70 19s., gaining 10 per cent. on what it cost him. What did A pay for the horse?

(11) A sells it for $\frac{107\frac{1}{2}}{100}$ of cost price $= \frac{215}{200} = \frac{43}{40}$

B " " $\frac{11}{10}$ of $\frac{43}{40}$ " $= \frac{11 \times 43}{400} = 1,419$s.

Cost price (*i.e.* 1) $= \frac{1419 \times 400}{11 \times 43} = 1200$s.

$= £60$. Ans.

12. In what time will £3,200 amount to £4,460 at $3\frac{1}{2}$ per cent. per annum, simple interest?

(12) £3,200 produces £32 × $3\frac{1}{2}$ per year = £112
To get £(4,460 − 3,200) will take $\frac{1260}{112}$ years.
$= 11\frac{28}{112} = 11\frac{1}{4}$ years. Ans.

13. A casket contains diamonds and pearls; the diamonds are worth as many times the pearls as the pearls are worth the casket, and the values of the diamonds and the casket are £3,411 9s. and one guinea respectively. Find the value of the pearls.

(13) £3,411 9s. = $\frac{68229}{21}$ guineas = 3,249 guineas
Value of pearls = $\sqrt{3249}$ guineas = 57 guineas.
= £59 17s. Ans.

14. Find the present worth of £1,755 15s. $6\frac{1}{2}$d. due four months hence at $4\frac{1}{2}$ per cent. per annum.

(14) £1,755 15s. $6\frac{1}{2}$d. = £$\frac{1217}{960}$
£100 for 4 mo. at $4\frac{1}{2}$% = $\frac{1}{2}\frac{1}{4}$. Amt. = £$\frac{1}{1}\frac{2}{4}$'
Present Worth of £$\frac{1}{1}\frac{2}{4}\frac{1}{2}$ = £100
" " 1 = £$\frac{100}{1217}$
" " $\frac{1685545}{960} = \frac{1200 \times 1685545}{1217 \times 960}$
= £$\frac{6823}{4}$ = £1,731 5s. Ans.

15. What income is derived from the investment of £188,497 in the $2\frac{3}{4}$ per cents. at $101\frac{1}{4}$? (Brokerage not to be reckoned.)

(15) £$101\frac{1}{4}$ will produce £$\frac{11}{4}$
1 " £$\frac{11}{4} \times \frac{4}{405}$ = £$\frac{11}{405}$
188497 " $\frac{22 \times 188497}{809} = 22 \times 233$
= £5,126. Ans.

History.

1. Explain the circumstances which led to the Norman Conquest, and give a short account of the battle of Hastings.

(8) The Saxon monarch preceding Harold had been many years in Normandy, and was indeed more a Norman than a Saxon. When made king he brought over shoals of Normans, and bestowed various offices upon them; this no doubt first put into the mind of Duke William the idea of invading England. And when Harold, the future king of England, was, by shipwreck, in William's power, he had to promise his help to the Normans on their invasion before he was released. William heard in 1066 of the accession of Harold, and immediately set about preparing for his projected attack. He alleged as his reasons—(1) The perjury of Harold (who had promised his support). (2) The bequest of the late king Edward. (3) The massacre of the Danes by Ethelred 60 years before. (4) The expulsion of the Normans (1052) from England through the influence of Godwin (Harold's father). The first reason brought the Papal sanction, and a consecrated banner. William landed at Pevensey, and marched towards the English encampment at Senlac. The *Battle of Hastings* was for five or six hours undecided; till a feigned retreat of the Normans enticed the English from their palisades on the hill-top, when they were attacked by the Norman cavalry. Arrows and bolts were thinning the ranks of the Saxons, and when Harold was struck the battle was decided. The Saxons broke and fled, and the victory remained with the Normans.

10. State any facts you know relating to the foreign policy of Cromwell and of Charles II. respectively.

(10) *Cromwell*, though not fortunate in his home government, was eminently successful in his foreign policy, and made England as much respected by other nations as in Elizabeth's time. He humiliated the Dutch (in 1652–4); Louis of France sought his aid against Spain, and handed over Dunkirk to England as payment for the service of the English veterans; the Mediterranean pirates were taught to respect the English flag; and the Duke of Savoy was obliged to cease his persecution of the Waldenses (the Protestants of Vaudois). *Charles II.*, on the contrary, was ready to submit to any nation if it suited his purpose. His great purpose was to remain king of England without being under the control of Parliament. This he thought he could accomplish by cultivating the friendship of Louis. As a specimen of Charles' traitorous, truckling policy, we have the treaty of Dover (1670), when he promised to profess himself a Catholic and join Louis in the war against Holland; thus, while he agreed to the severe laws against Papists passed by Parliament, he was a Catholic himself, in receipt of a pension from a Catholic king.

11. In whose reigns did Dryden, Chaucer, Sir Walter Scott, Sir Philip Sydney, Thomas Carlyle, and George Herbert live respectively? Mention the writings of any two of them.

(11) *Dryden*, William III.; *Chaucer*, Edward III.; *Sir Philip Sydney*, Elizabeth; *George Herbert*, Charles I. *Sir Walter Scott*, George III. and George IV. His chief *works* are:—(1) 'Lady of the Lake,' (2) 'Lay of the Last Minstrel,' (3) 'Marmion,' (4) 'Lord of the Isles,' (5) a long series of novels, including 'Waverley,' 'Ivanhoe,' 'Guy Mannering,' 'Antiquary.' *Thomas Carlyle* lived in reigns of William IV. and Victoria. *Works*:—(1) 'French Revolution,' (2) 'Letters and Speeches of Oliver Cromwell,' (3) 'History of Frederick II. of Prussia,' (4) 'Sartor Resartus.'

12. When and in what circumstances were the following battles fought:—Aylesford, Barnet, Corunna, Vinegar Hill, and Lexington?

(12) *Aylesford*, 455.—The Jutes under Hengist and Horsa defeat the Britons. Horsa slain.

Barnet, 1471.—Warwick the 'king-maker' is defeated and slain by Edward IV.

Corunna, 1809.—Sir John Moore repels French, but is killed in action.

Vinegar Hill, 1798.—General Lake crushes the Wexford rebellion.

Lexington, 1775.—The skirmish which opened the war with the American Colonies.

14. Explain what is meant by the Star Chamber, Bill of Attainder, Habeas Corpus, Ship Money, Act of Supremacy, and Poyning's Law.

(14) *Star Chamber*.—The court instituted by Henry VII. It punished by fines and imprisonment, but had not the power of life and death. It grew tyrannical and was abolished in 1541 by the Long Parliament.

Bill of Attainder.—An accusation drawn up by the Commons against some person or persons, and tried by themselves. The House of Commons is thus both prosecutor and judge; hence a bill of attainder is unjust.

Habeas Corpus.—The writ, which every prisoner can claim if unduly detained, directing the gaoler to bring him up for trial. The name of a bill passed in 1679 to prevent illegal and indefinite imprisonment, and forbidding imprisonment beyond sea.

Ship Money.—Originated in 1008. The assessment levied for the building and equipment of ships for national defence. Appears prominently in history in connection with John Hampden (1634).

Act of Supremacy passed in 1534 made Henry VIII. the head of the Church, with power to redress heresies and abuses.

Poyning's Law or Statute of Drogheda passed in 1495 enacted (1) No bill could be introduced into the Irish Parliament before it had been approved by the English Parliament; (2) All statutes lately passed in England should be law in Ireland.

Grammar.

1. Analyse fully the following passage, and parse the words printed in *italics*:—

When Henry *the Eighth* attempted to raise a forced *loan* of unusual amount by proceedings of unusual rigour, the opposition *which* he encountered was such *as appalled even* his stubborn and imperious spirit.

(1)

SENTENCE	KIND OF SENTENCE	SUBJECT	PREDICATE	OBJECT	EXTENSION
1. When Henry the Eighth attempted to raise a forced loan of unusual amount by proceedings of unusual rigour	Adverbial (time) to (2)	Henry the Eighth	attempted	to raise a forced loan of unusual amount	when (time) by proceedings of unusual rigour (manner)
2. The opposition was such	Princ. Assert.	The opposition	was such		
3. which he encountered	Adjectival to (2)	he	encountered	which	
4. as (that was)	Adverbial to such (2)	(that)	(was)		
5. (which) appalled even his stubborn and imperious spirit.	Adjectival to (that) in (4)	(which)	appalled	his stubborn and imperious spirit	even (degree)

The — Def. Art., referring to *Henry*.
Eighth — Ord. Numeral Adj., limiting *Henry*.
loan — Com. Noun, Sing. Num., Third Person, Neuter Gend., Obj. Case, govd. by *raise*.
which — Rel. Pron., Sing. Num., Third Person, Neuter Gend., agrg. with its antec. *opposition*, Obj. Case, govd. by *encountered*.
as — Conj. joining sentences 2 and 4.
appalled — Verb, Reg. Trans., Act. Voice, Indic. Mood, Past Tense, Sing. Num., Third Person, agrg. with Nom. *which* (und.)
even — Adv. of Degree modg. *appalled*.

2. Paraphrase the following passage, and parse the words in *italics*:

There is in souls a *sympathy* with sounds,
And as the mind is pitch'd the ear *is pleased*
With melting airs or *martial*, brisk or grave.
Some chord in unison with *what* we hear
Is touch'd within us, and the heart replies.
How soft the music of those village bells
Falling at intervals upon the ear
In cadence sweet! now *dying* all *away*,
Now pealing loud again and louder still,
Clear and sonorous as the gale comes on,
With easy force it opens all the cells
Where memory slept.

(2) Music has a peculiar power of awakening emotions within us, and according to our mood, we appreciate some particular style of music. Something seems to respond to the sounds; the very heart seems to beat with the rhythm of the music. For instance, how the chimes of the village bells can affect us; as the sound waxes and wanes with the varying wind, every word and scene associated with the chimes is clearly revived in our minds, after lying dormant, it may be, for years.

Sympathy — Abstr. Noun, Sing. Num., Third Person, Neuter Gend, Nom. Case to *is*.
is — Aux. of Pass. Voice to '*pleased*.'
pleased — Past Part. of Reg. Verb. *to please*.
is pleased — Verb, Reg. Trans., Pass. Voice, Indic. Mood, Pres. Tense, Sing. Num., Third Pers., agrg. with Nom. *ear*.
martial — Adj. of Qual. qualg. *airs*.
what — Compound Rel. Pron. = that which.
that — Disting. Adj. qualg. (*music*).
which — Rel. Pron., Sing. Num., Third Pers., Neut. Gend., agrg. with antec. (*music*); Obj. Case govd. by *hear*.
dying — Pres. Part. of verb *to die*, qualg. *music* (in 6th line).
away — Adv. of Place, modg. *dying*.

3. Analyse the following lines, and parse the words in *italics*:—

The heights by great men *reached* and kept
Were not attained by sudden flight;
But they, while their companions slept,
Were toiling upward in the night.

(3)

SENTENCES	KIND OF SENT.	SUBJECT	PRED.	OBJ.	EXT. OF PRED.
1. The heights by great men reached and kept were not attained by sudden flight	Principal Assertive	the heights reached and kept by great men	were attained		not (negative) by sudden flight (manner)
2. But they were toiling upward in the night	Princ. Assert. Adversative to 1	they	were toiling		upward (place), in the night (time)
3. while their companions slept	Adverbial (time) to 2	their companions	slept		while (time)

Reached	Past Part. of *to reach*, qualg. *heights*.
were	Aux. of Pass. Voice to *attained*.
not	Adv. of Negation, modg. *were attained*.
attained	Past Part. of verb to attain.
were attained	Verb, Reg. Trans., Pass. Voice, Indic. Mood, Past Tense, Plur. Num., Third Pers., agrg. with its Nom. heights.

4. Name the different classes of conjunctions, and give an example of each.

(4) I. *According to the kinds of sentences they join* :—
(1) *Co-ordinative*, joining two principal sentences; as—'He rose *and* looked earnestly at me.'
(2) *Subordinative*, joining principal with subordinate; as—'I told him *that* I could not go.'

II. *According to their meaning* :—
(1) *Copulative*, joining in form and also in meaning; as—'The king rose *and* all did the same.'
(2) *Disjunctive*, joining in form, but disconnecting the meaning; as—'I called *but* he returned no answer.'
(3) *Correlative*, those used in pairs; as—'I love *both* flowers *and* trees.' 'He had *neither* friends *nor* money.'

6. Give three prefixes of Saxon and three of Latin origin, and three suffixes by means of which nouns are derived from verbs, with two examples under each head.

(5) I. *Saxon Prefixes*—
En (= to make) as in enable, enrich
off (= from, away) ,, offal, offshoot
un (= reversal) ,, unfurl, unlock

II. *Latin Prefixes*—
Pre (= before) as in precede, preamble
sub (= under) ,, submarine, subvert
trans (= across) ,, transport, transparent

III. *Suffixes*—
Ster, as in spinster, songster
ance, ,, acceptance, assistance
or, ,, actor, editor

7. Write notes of a first lesson on the analysis of a simple sentence.

(7) *Time*, 20 min. *Class*, Standard IV.
Apparatus (1) Blackboard and accessories.
(2) Slates for scholars.

MATTER TO BE TAUGHT.	METHOD OF TEACHING.
Examples— (the) Fire burns bread is good I am looking You are tall he spoke (the) room is large. The *Subject* is that about which we are speaking. The *Predicate* is what we say about the Subject.	Obtain some nouns and pronouns from class; select the most suitable to be written on the board in a column. Then ask for *something about them*, as exemplified in other column. Then take the first line (*i.e.*, the fire burns) and by question educe that we are speaking about *fire*; treat others in similar way. Tell them the name *Subject*. Returning to first piece 'What do we *say about* fire?' &c. What we say about the subject is the *Predicate*. Give short sentences to analyse on the slates.

Composition.

(2) *The importance of the telegraph and telephone from a commercial point of view.*

One of the greatest of the many boons of modern time is the facility with which we can communicate with distant parts of the earth. For this we are indebted to the power of electricity, as applied in the telegraph and telephone. The network of wires running over land and under sea is a very important factor of the commerce of to-day.

We have only to cast a glance at a newspaper to see the connection between trade and telegraph. Stock Exchange news, market quotations can be made known afar off in a very short time, so that markets are equalised, or rather the whole world becomes merely *one* market. It does not affect the productive power of a country, but it remarkably aids in the distribution of the produce. It also minimises the risk of panics and failures, for we can by its means receive speedy intelligence of events bearing on our particular trade or industry, and act accordingly.

The telephone is of great service for shorter distances. It is in fact the most convenient and ready means of communication we have, for it dispenses with letter-writing, and there is no special mode of signalling to acquire as in the telegraph. It stands in the same relation to the telegraph that a wheel-barrow does to a railway-truck—not so powerful and far-reaching as the telegraph, but more handy for petty purposes. Doctors find it a useful communication between the surgery and the private house; main stores and branches are brought 'next door' to one another by its means, and towns at moderate distances can be connected. The system is much more used in America than in our own country, and proves a valuable adjunct in commercial affairs.

Euclid.

(*Three hours allowed for this paper.*)

(Marks are given for portions of questions.)

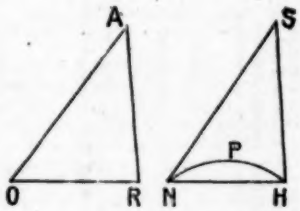
In the Euclid questions all generally understood abbreviations for *words* may be used, but no symbols of *operations* (such as −, +, ×) are admissible.

N.B.—Capital letters, not numbers, must be used in the diagrams.

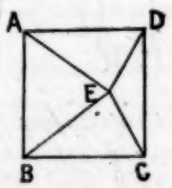
1. (*a*) If two triangles have two sides of the one equal to two sides of the other, each to each, and have likewise the angles contained by these sides equal to one another, they shall also have their bases or third sides equal; and the two triangles shall be equal, and their other angles shall be equal, each to each, namely, those to which the equal sides are opposite.

(*b*) ABCD is a square, ABE an equilateral triangle. If EC, ED be drawn, the triangle DEC is isosceles. (It may be assumed that the equilateral triangle is equiangular.)

(1) (*a*) (Euclid I. 4.) Let AOR, SNH be the two triangles, having OA, and AR respectively = NS, SH, and angle A = angle S. Then the triangles shall be equal in every respect.



Apply the triangle OAR to NSH, placing A upon S, and AO upon SN, then O will coincide with N, because AO = SN (hyp.); AR will coincide with SH, because angle A = angle S, and R will fall on H because AR = SH. So base OR must fall on base NH, for if the two ends fit and the lines themselves do not, but appear as NPH we shall have two straight lines enclosing a space; this is impossible. So OR must fit NH, and we see that the triangles fit each other on all sides, and are in every way equal.

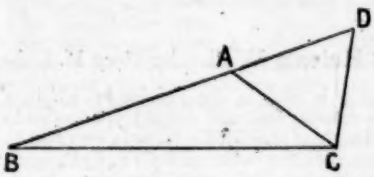


(*b*) Angle DAB = CBA, angle EAB = EBA. Take latter from former respectively, then (ax. 3) angle DAE = CBE, and AD = BC (def. 30) and AE = BE (def. 24.) Therefore (I 4) ED = CE and ECD is isosceles (def. 25).

2. (*a*) Any two sides of a triangle are together greater than the third side.

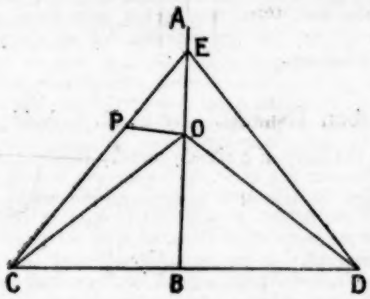
(*b*) AB bisects CD at right angles at B; P is a point within the angle ABC, and CP produced cuts AB at E. Show that the difference between ED and EP is greater than that between any other two lines drawn from P and D to meet AB.

(2) (*a*) Eucl. I., 20. To prove BA and AC together greater than BC. Produce BA to D making AD = AC (I. 3.) Join



CD. Angle ADC = ACD (I. 5.) To ACD add ACB. Then DCB is greater than ADC. Therefore (I. 19) BD is greater than BC. BD = BA, AC (constr.) Therefore BA, AC together greater than BC. Similar proof for any pair of sides

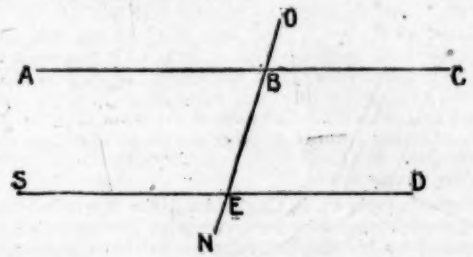
(*b*) CB = DB (hyp.), EB common; and angle EBC = EBD (ax. 11.) Therefore (I. 4) EC = ED and PC is dif. between EP and ED. From P draw any other line PO to AB, and join



OD, OC. As before OC = OD (I. 4) CP, PO together greater than CO (I. 20.) From each take PO. Then CP is greater than difference between PO and OC, *i.e.*, between PO and OD.

3. (*a*) If a straight line falls on two parallel straight lines, it makes the alternate angles equal to one another, and the exterior angle equal to the interior and opposite angle on the same side; and also the two interior angles on the same side together equal to two right angles.

(*b*) P is a point between two given parallel straight lines, such that any two straight lines drawn through P always intercept equal portions of the parallel straight lines. Show that P is equidistant from the parallels.

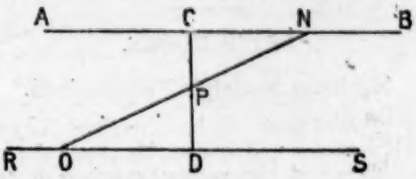


(3) (*a*) Euclid I. 29. Prove (1) ABE = BED; (2) OBC = BED; (3) CBE and BED together = two right angles.

(1) If not equal let ABE be greater. To each angle add CBE. Then CBE, BED less than ABE, CBE; that is, less than two right angles (I. 13), and so AC. SD will meet towards C and D (ax. 12); but they cannot meet because parallel (hyp. and def. 35). So ABE cannot be greater than BED, similar proof shows that BED is not greater, ∴ ABE = BED.

(2) OBC = ABE (I. 15) = BED (see above, No. 1).

(3) To the equals ABE, BED add CBE. Then CBE, BED = ABE, CBE (ax. 2) = (I. 13) two right angles.

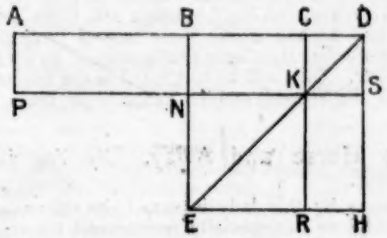


(*b*) To prove the perpendiculars PC, PD on the parallels AB, RS equal.

Draw through P any other straight line ON, meeting AB at N and RS at O. CN = OD (hyp.), angles NCP, CNP = PDO, DOP respectively (I. 29). Therefore (I. 26) CP = DP.

4. (*a*) If a straight line be divided into two equal parts, and also into two unequal parts, the rectangle contained by the unequal parts, together with the square on the line between the points of section, is equal to the square on half the line.

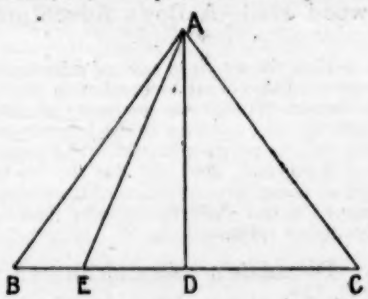
(*b*) From the vertex of an isosceles triangle a line is drawn to any point in the base. The square on a side of a triangle is equal to the square on the line so drawn together with the rectangle contained by the segments into which the line is divided.



(4) (*a*) Euclid II. 5. Let AD be divided equally at B, unequally at C, into two parts. Then rect. ACCD with square on BC shall = square on BD.

On BD describe square BEHD. Join DE (I. 46). Through C draw (I. 31), CR par. to DH or BE, cutting DE at K. Through K draw SP par. to AD or EH, and through A, AP par. to BE. Complement BK = KH (I. 43); to each add CS. Then CH = BS (ax. 2) = AN (I. 36). To equals AN, CH, add BK. Then AK = gnomon BSR (ax. 2). To last equals add square NR (a *square* by II. 4 Cor.) Then AK and NR together = square BH. AK is rect. AC, CD, for CK = CD (II. 4, Cor.) and NR is square on BC for NK = BC (I. 34).

∴ Rect. AC,CD, with square on BC = square on BD.



(*b*) Bisect BC at D (I. 10); join AD. AB, BD = AC, CD respectively and angle B = angle C (I. 6). Therefore angle ADB = ADC (I. 4), *i.e.*, AD is perp. to BC (def. 10). If AD is the line drawn to the base, square AD, and square BD = square AB (I. 47). Square BD = rect. BD,DC. But let the line fall as at AE. Then (II. 5) square DB = square DE and rect. BE,EC. To each add square on AD. Then squares BD, AD = squares ED, AD and rect. BE,EC, *i.e.*, (I. 47), square AB = square AE and rect. BE,EC.

(To be continued.)

Publications Reviewed.

PRIZE BOOKS.

National Society's Publications.

The parcel of books we have received this year for review is attractive and remarkably cheap, the names of the authors rank high among the writers of the day, the illustrations are chiefly by Staniland. Parents and teachers cannot do wrong in selecting presents and prizes from this list.

(1) **Carried off.** A Story of Pirate Times. By Esmè Stuart.

This popular writer has again come to the front with a charming tale of the time of King Charles. The very title suggests all kinds of adventures, no boy will take up the book without a quickening of the pulse, expecting many thrilling accounts of battles, feats of daring, and hair-breadth escapes. We can promise that his anticipations will be fully realised. The scene is chiefly laid in the West Indies, where the pirates attacked the island of St. Catherine. Don Estevan del Campo, the governor, panic-stricken, surrendered, but his brave son Carlo refused to submit, and he and Harry Fenn passed through much tribulation before they were finally rescued by an English man-of-war. Girls will be interested in the adventures of Etta and the Spanish maidèn Felipa in all these stirring scenes.

(2) **To Horse and Away.** By Francis Mary Peard.

Any story by this lady is sure to be welcomed by all readers, and we can specially recommend the one before us. It opens in the year 1652 when England was divided into two great parties, and 'men's hearts were aglow with pity, rage or anxiety.' It gives a vivid picture of the perilous time when Charles was a fugitive. How the Royalist family who lived at the Red House suffered for their allegiance to their king, and how he finally escaped to France through the unparalleled devotion of his adherents will be read with deep interest. Diana Amyott is finely drawn, she is deservedly the heroine of the book, and brave hearted little Joyce will be a favourite with every one, the other characters are life-like, and carry the interest on to the very last page. The book is suitable for our elder boys and girls.

(3) **Starwood Hall—A Boy's Adventure.** By the Author of 'A Greek Idyl.'

'Starwood Hall' is simply a tale of adventures that befell a country lad who went to London in the hope of making his fortune. He fell into the hands of a highway-man, but making his escape he at last reached the great city to find it was not paved with gold. The pages of the book are full of incident, boys will like the stir and life. The purpose no doubt is to inculcate contentment with a safe and happy lot, and show the dangers that attend a restless, dissatisfied spirit.

(4) **Mrs. Dimsdale's Grandchildren.** By M. & C. Lee.

This relates the history of a houseful of children during the Christmas holidays—and though this may appear at first a somewhat worn out theme, the characters are so daintily and truthfully sketched in, and the various adventures are described with such freshness and vivacity that we are sure all young readers will be captivated by the book. The illustrations are scarcely up to the level of the writing, though that of the children tobogganing down the stairs on tea trays has caught more of the author's spirit than the rest.

(5) **Our New Mistress.** By C. M. Yonge.

This is a tale with an obvious moral. It is none the less suited to the class of readers for which it is intended, and it will be added with satisfaction by the admirers of Miss Yonge to the large number of volumes she has already contributed to Sunday school and village libraries. Her style is so widely appreciated that we need not point out its many excellencies. Mothers and teachers know full well they can put any book by this author into their girls' hands without hesitation.

(6) **St. Helen's Well.** By Mary H. Debenham.

The story is told by the heroine herself in a simple, attractive manner that will delight young children. She was the daughter of Royalist parents who had to fly from their home after the defeat of the Young Pretender. The nurse took the two children to her home in an obscure village in Wales, here they lived safely for some years, but Nest pined for her lost mother and became seriously ill. Meg dearly loved her sister, and when told by an old Welsh woman that the water from St. Helen's well would certainly cure her, she determined to get some. It was a long and dangerous journey for a child of fourteen through the wild mountains of Wales a hundred and fifty years ago, but her love sustained her, and she safely reached the well. The rest of her adventures and the happy result will be the pleasant lot of many young readers to find out.

(7) **Reuben Everett.** By C. R. Coleridge.

This is the story of a simple country family, the father and mother sterling, steady-going people, contented with their modest lot, unable to understand the restlessness of youth and the desire of their young ones to rise in the world and see more of life than the little village of Ripple-hurst contained. They opposed Edward becoming a schoolmaster, and Agnes a pupil teacher, until the rector convinced them of their mistake, but it was with heavy hearts they saw Edward leave the old home for St. Mark's College. When Reuben asked them to let him get work on the line, with a view to being an engine-driver, they utterly refused. The lad could not rest, and eventually ran away from home. The sorrow and trouble this caused, and Reuben's repentance and return home are all graphically described.

(8) **Silver Star Valley.** By M. Bramston.

An admirable book for boys, girls also will read it with avidity. We have followed the fortunes of Ted, the hero, from the first page to the last with real interest, so vividly are the scenes depicted, so natural and life-like are the different characters. Ted has temptations, and, like other boys, sometimes yields to them, he is not too good, but he is a fine fellow, and his efforts 'to keep his heart faithful and his lips true,' will rouse every reader's admiration and affection. The tone of the book is commendable, religious without it being thrust forward too conspicuously. We cordially recommend it for its thoroughly healthy, manly spirit.

Ted is brought up in England till the age of sixteen, he is then sent out to the Far West to his father, who is supposed by his English relatives to be a prosperous farmer. Ted is horrified to find him the keeper of a drinking bar in a mining village, but the father has sufficient knowledge of what is right left in him to place his son with a high-principled Scotch farmer. His life for the next two years is well told, the bear hunt, his courageous rescue of Mercy Malcom, his friendship with Giant Jim, the miner, and successful efforts in saving his father's life, give variety to the narrative. Sweet, motherly Mrs. Malcom is a delightful character. The illustrations do not give our idea of Giant Jim.

A Latin Prose Primer. By J. Y. Sargent, M. A. (Clarendon Press.)

Mr Sargent, whose peculiar skill as a teacher of Latin Prose Composition has long been in great esteem at his own university, has produced in this book a manual for which many a candidate for matriculation will be grateful. It is a book for the learner, perhaps, rather than the teacher; the method it adopts is one which it would be difficult to follow with a large class. For the private student it will be very helpful. The author's plan is to take a piece of English prose—he has chosen the first fifty of the selections printed in the last edition of his 'Easy Passages for Translation into Latin Prose'—and carefully analyse it, sentence by sentence, pointing out where the English prose style differs from the Latin, especially in the formation of periods, and the expression of their logical connexions, and explaining where and why the thought of the writer will require to be expanded or will admit of simpler expression, or will need to be cast in an altogether new mould. This first process he calls the *Praeparatio;* it is followed by the *Constructio*—the whole passage in its new dress; that is to say, as it would appear in a literal English translation from the completed Latin Version; lastly comes the *Materia*, a *catalogue raisonné* of the less familiar expressions, giving alternative Latin words or phrases, and materials to guide the student in his choice. The danger lies in the misuse of the *Constructio*, lest the indolent pupil find it the easier and shorter method to write his exercise straight from the adapted version, and so miss the labour of the conscientious *Praeparatio*, and with it the whole educational value of his work. It is a pity, too, that the English originals are not reprinted in the book; as it is, it can only be employed in conjunction with a copy of the 'Easy Passages.'

Xenophon's Cyropædia. Book I. By C. Bigg, D.D. (Clarendon Press.)

One is inclined to wonder that the Cyropædia—or at least this first book—is so much less read in schools than the Anabasis or Hellenica. The Greek is hardly more difficult, and the subject much more attractive, the story told gracefully, and with humour. On the other hand, the tale of Cyrus' childhood has about it a strong flavour of 'Sandford and Merton,' which is probably less relished now than it was by our fathers. Dr. Bigg in this edition has taken pains to make it easy for his young readers. The text is cut up into sections, each headed by a brief summary of its contents, as 'How Cyrus won all hearts,' 'Why he was more talkative as a boy than as a youth,' 'How Cyrus made his first speech,' and so on. The notes are short and written with careful simplicity; those on varieties and irregularities of grammatical construction are especially commendable in this respect, though some teachers will object to the large amount of direct translation, without further comment, which is given. The introduction might very well have been compressed within narrower limits; twenty pages of preface to seventy of much more widely printed text is surely more than necessary for the purposes of a school edition.

An Introduction to Latin Syntax. By W. S. Gibson, M.A. (Clarendon Press.)

Mr. Gibson's little book is a step in the right direction for the improvement of teaching in the elements of Latin Syntax. His method is to work up from the instances to the general rule, which should be the conclusion and summary of the learner's knowledge of the matter it treats of, and not, as is usually the case, his first introduction to it. In each section he starts with a few short sentences, intended to be translated, parsed, and learned by heart; then comes an analysis of each sentence, in which every difficulty at which experience has shown the learner is likely to stumble, each misconception which will lead him astray, is carefully anticipated and dealt with in the simplest possible language, so that the wayfarer, though a fool, can hardly mistake the right path. Then come the exercises, calling for the application of the newly learned rule. Within the limits which he has set for himself (he stops short of the syntax of the compound sentence) the author has done his work very completely, and the book ought to be serviceable to the teacher as well as to the taught. Only long experience can give the familiarity with the curious incapacities and divagations of a child's intelligence which the author's treatment of his subject shows; and without some such acquaintance with the nature of the material he has under his hand, the teacher, like any other craftsman, is apt to spoil a great deal of it, before he produces a finished piece of work. The arrangement of the vocabulary at the end of the book according to the parts of speech to which the words belong is an ingenious device to counteract a common form of indolence or carelessness in the learner.

Xenophon's Anabasis. Book III. By J. Marshall, M.A. (Clarendon Press.)

This edition is published in two volumes, the one of which contains a vocabulary, the other the introduction, text, and notes. The vocabulary is of the simplest character, giving little beyond the renderings of the words as used in this portion of the author, and some rather scanty grammatical information (no etymologies). Such a vocabulary can only be intended for the service of beginners who have not yet sufficient acquaintance with Greek to use a general Lexicon readily and profitably. But the style in which a good deal of the annotation is written seems inconsistent with the purpose implied in the supply of a vocabulary. Many of the notes, and particularly those which deal with points of syntax, are apparently intended for the use of maturer students, if one may judge from the form in which they are put, and the references to Goodwin's Greek Syntax. But it is open to question whether it is possible to supply the wants of both classes in the same book, without running a risk of adding to the perplexities, and creating needless confusions in the minds of the younger. In other respects the book is well arranged and annotated, the commentary being quite adequate, and at the same time kept within very moderate limits. The introduction contains an analysis of the contents of the text, with some interesting quotations from Layard's work on Nineveh, to illustrate the route taken by the Greeks in the beginning of their retreat.

English Passages for Translation into French. By A. C. Clapin, M. A. London: George Bell and Sons.

A collection of short passages, partly from English authors, partly translated or adapted from the French, and intended for the use of persons preparing for the army and other examinations in which French composition is required. The passages are printed without any annotations for the help of the pupil, and are plainly intended for the use of tolerably advanced students. Curiously, the English author, whose writings are most frequently laid under contribution, is Bulwer Lytton.

Diagrams of Colour: No. 1, Colours and their Combinations; No. 2, Spectrum Analysis. By J. Howard, F.C.S. Edinburgh and London: W. and A. K. Johnston.

These diagrams have evidently been very carefully prepared, and great pains taken in the printing to secure the correct colours. It goes without saying that in the case of spectrum analysis, or indeed of colour combination, a few practical experiments would convey more information, and carry more impressive force, than any amount of wall diagrams; but practical experiments cannot always be carried out, and then it is well to have good diagrams, such as these, to fall back upon.

Sheet No. 1 deals with Colours and their Combinations, and illustrates as vividly as possible the Primary, Secondary, and Tertiary colours, together with sundry peculiar

effects consequent on the arrangement of certain colours. Sheet No. 2 is devoted to Spectrum Analysis, and besides giving a very satisfactory representation of the graduation of colours in the solar spectrum and the appearance of Fraunhofer's lines, together with the characteristic spectra of eight or ten of the metals, contains also illustrations of the prism, spectroscope, revolving colour disc, &c. A word of praise, too, must be given to the little handbooks accompanying the diagrams, which in a compendious form supply a considerable amount of useful information.

Natural History Plates. Edinburgh and London: W. and A. K. Johnston.

The four plates now before us are excellent examples of the pictorial assistance which the resources of modern lithography can give to teachers and scholars. It would be somewhat difficult to point out any department of art which can exhibit greater progress during the past forty years than lithography. Not many years ago plates such as these were practically unattainable, except at prohibitive prices. Then the drawing, too, was often erroneous, the colouring fanciful and capricious, and the general result grotesque rather than true to nature. It is indeed somewhat amusing to glance over the illustrations in an old book of natural history and note the quaint way in which some of the delineations were carried out. Now, *tempora mutantur*, and with the times the illustrations. The present plates are admirable in every respect. The colouring is bright and truthful, the drawing accurate, and the general appearance very creditable and satisfactory. The subjects represented are the Giraffe, the Peacock, the Vampire Bat and the Flying Fox, Butterflies and Moths. In the last-mentioned plate the Peacock butterfly and the Swallow-Tailed have been selected to represent the butterflies, and the Death's Head Moth the moths; the caterpillar form and chrysalis state being also illustrated.

Algebraic Factors. By Dr. W. T. Knight. London: Blackie and Son.

A long experience in the examination of papers from pupil teachers and candidates for various examinations has shown us how really few young students are able, adequately, to use the power which ability to factorise would give them. A page of an examination paper is often filled where a line or two would suffice. Dr. Knight's little book contains clear explanations of the methods of finding factors, the way to use them, and in this new edition examples of the method of saving time by their use in the examination room. Drill in the general results observable in multiplication and division in algebra should be as common as is the drill necessary in the tables in arithmetic. Just as the latter is sometimes rather nauseating to the very young pupil, so the former may be; but future success depends almost entirely on the complete mastery of these formulæ, and their application. And when once the pupil has been led to see the use which can be made of them, he will be anxious to exercise his ingenuity with them. Dr. Knight is a pleasant guide to this desirable goal, and the practical application of his teaching to the solution of the examples given in various examinations is a valuable addition to his work. To pupil teachers and young students generally we cordially recommend the book in its new form.

Jackson's Pens for New Style of Upright Penmanship. Nos. 1 to 4. London: Sampson Low and Sons.

Most of our readers have probably seen something of the new style of vertical writing which is taught in a series of copybooks published at St. Dunstan's House. The author of the series of books has provided some pens specially adapted for this kind of writing; and, having given them a fair trial, we are able to state that they serve their purpose remarkably well. No. 1 and No. 4, the latter a correspondence pen, please us best, the others being rather too fine in the point for general use.

Pictorial Astronomical and Geographical Diagrams. Edinburgh and London: W. and A. K. Johnston.

This sheet of diagrams is designed to give pictorial aid in the elucidation of the terms commonly met with in the study of Geography, and although the colouring and general lithographic work is in some respects somewhat rougher and less exact than is quite compatible with the clearness that ought to be aimed at in diagrams for school use, the main defect is that too much has been attempted on the one sheet. There seems to be quite enough subject matter on this one chart to occupy three or four of the same size, if due regard is to be paid to the chief object of wall-sheets—facility of reference in class use. In other respects, such as in selection of terms illustrated and general design and grouping, the diagrams seem all that can be desired.

Royal Star Arithmetics: In Seven Books. London and Edinburgh: T. Nelson and Sons.

The exercises in the earlier numbers of the series are based upon previous mental work—addition, subtraction, multiplication, and division drill being prefixed to the various rules, and often to each page, as required. The Arithmetics are essentially books of examples, as, although definitions and rules are given in some of the later books, no reasons or explanations are added. The books provide an immense number of examples, both mechanical and problematical. They can be had bound together in one volume, uniform with others of the Star series. A good feature is the addition of the rules not included in the usual code work, and twenty pages of rules and examples in the Mensuration of Surfaces in the book for Standard VII. Sufficient practice will be found in them for the year's work, and, if preceded and accompanied by good teaching, the use of the books cannot fail to produce good results.

Coloured Historical Wall Sheets. London: Cassell and Co.

To this really excellent series of cartoons we give our cordial commendation. In pictorial effect and general design they are alike admirable, and as an interesting adjunct to the history lesson they will doubtless give great satisfaction. The following six subjects have thus far been illustrated: The Landing of the Romans in Britain, King John signing Magna Charta, Queen Elizabeth at Tilbury Fort, Cromwell dissolving the Long Parliament, the meeting of Wellington and Blucher, and the Queen arriving at Westminster on the occasion of the Jubilee; and other cartoons are, we are led to understand, in course of preparation. If the high standard of excellence observable in these commencing cartoons is maintained in subsequent issues, the publishers may be congratulated on having practically inaugurated a new era in the history of school wall decoration.

The Elements of Logarithms, with the Sandhurst and Woolwich Questions, 1880—87. By G. W. Gallatly, M.A. F. Hodgson.

This is a pamphlet of 30 pages excellently printed on good paper. It consists, as might be expected, of the ordinary propositions on the nature and use of logarithms. The explanations are often fuller than usual; the demonstrations are neat and clearly arranged. What will make the book very useful to students is the abundance of fully worked out examples. These are models in the best sense. They are logically arranged and easy to follow. In addition to the examples in the text, the questions set at the recent examinations are appended, and, what will be found most useful, the answers to them. We feel sure that this little work will have a large circulation. It deserves it. The author asks for suggestions. We think the advantages of the common system might be set out a little more strikingly. It might also have been more clearly stated when the Napierian logarithms are used.

Slojd. By Emily Lord. Cassell and Co.

A sixpenny pamphlet, written to show that the handcraft known as Slöjd is a means of teaching the essential elements of education. This is of course a great claim. To our minds the author does not make it good. She quotes from the author of the system, and tells us that 'manual instruction should aim principally at instilling a taste for and love of work in general; inspiring respect for rough, honest, bodily labour; training in habits of order, exactness, cleanliness, and neatness; accustom him to attention, industry, and perseverance; promoting the development of the physical powers; affording a training of the eye in the sense of form. Manual training must exercise the thinking power, and not be purely mechanical. There must be no division of labour, and so it must correspond with the capability of the child. Lastly, and as one of the aims is to cultivate general dexterity of the hands, that material must be employed which permits of the use of numerous manipulations and of various tools.' One feels, in reading all this, that there is a want of perception of the end to be attained and of the means for attaining it. Surely it might be claimed for a dozen things that they would promote exactly the same virtues which are here enumerated. Perseverance, industry, attention, neatness, cleanliness, are elementary virtues in which Englishmen have never been wanting. Nor can it be said that any system of wood-carving can afford such an accurate training of the eye as drawing and modelling. For many years past teachers have been suffering from the too enthusiastic and exaggerated advocacy of Frœbel's Kinder Garten. We seem to be gradually absorbing what is really essential in it, but it is taking a long time. And it may be that we have to go through a similar period of experiment and criticism of the various plans of manual instruction now before the public. We do not profess to see more clearly than others, and we may be wrong, but it does seem to us that what is really desirable lies within narrow bounds. We want first of all that a child shall be able to see what others too see, and that with a pencil he can represent what he sees; and we want to develop between the age of five and fifteen that nimbleness of finger and dexterity of hand which are indispensable in nearly all subsequent manual operations. There is at the present time accumulating scientific evidence that this nimbleness must be acquired in early life, or it can never be acquired to perfection at all; and apart from scientific evidence we have the testimony of experience, for in the case of such operations as require marvellous feats of manual skill the accomplishment has been in all cases acquired in early life. The glass blower begins when he is a boy, and every great pianist has begun when quite a child. We are therefore come to the conclusion, that if drawing and modelling were made universal and compulsory much would be done to secure the perfect training for both hand and eye. That a good deal might be done, in the case of boys, in the way of teaching them the use of simple tools, whether for the Slöjd training or ordinary carpentry, we do not for a moment doubt; indeed, we have seen the interest it creates, the health and intelligence it promotes. At present, however, we regard the subject as under discussion, and we do not admit that there is any perfect or complete system in the field.

Euclid. Books I.—VI. By H. S. Hall, M.A., and F. H. Stevens, M.A. Macmillan and Co.

The authors of this book are by this time pretty well known to teachers of Mathematics. They have given us in the book before us the first six books of Euclid's elements, together with the most important elementary developments of Euclid's Geometry. There has been very little alteration in the enunciations, and except in Book V. few departures from Euclid's proof. In Book I. the authors have used no contractions or symbols of any kind, but in the third and following Books all such signs and abbreviations as were thought to add to the clearness of the reasoning have been introduced. There is unfortunately at the present time a want of uniformity among mathematicians of eminence in regard to the more or less brevity admissible in writing out geometrical propositions. Some are always complaining that the propositions are too concisely stated. Others declare that Euclid's proofs as they are frequently printed are needlessly cumbrous and prolix. The authors would seem to incline to the latter view. Perhaps the most important part of the book consists in the additional matter, and the excellent set of graduated exercises upon the Propositions. We are glad to see that they refer to an edition of Euclid's Elements prepared by Mr. J. S. Mackay and published by Messrs. Chambers—a most excellent book, which we have often referred to with uniform pleasure and profit. There can be no doubt that this book will increase the reputation of the authors both as teachers and writers. Diagrams, the arrangement of the Propositions, the type, printing, and paper—all combine to make this one of the most attractive books on Geometry that has yet fallen into our hands.

Examples in Physics. By D. Jones, B.Sc. Macmillan and Co.

This is a book of 246 pages, excellently printed and bound. It professes to give a set of useful examples, followed by specimens and examination questions of greater difficulty upon all the subjects usually studied in a full course of Physics. But it is by no means a mere collection of examples. It commences with a clear though concise account of units fundamental and derived, and the dimensions of physical quantities. It gives enough of the theory of the subjects treated of to enable a student to work the examples set. There are ten chapters; one on each of the following subjects:—Dynamics; Hydrostatics; Heat; Expansion; Physical and Latent Heat; Conductivity and Thermal Dynamics; Light; Sound; Magnetism; Electrostatics and Current Electricity. There are, of course, in many of the best works on Physics sets of examples; the book is therefore not wholly new, and there is little therefore in the book that is quite new. But it is often convenient to have an excellent question logically arranged, and we therefore think this book will meet a want often felt, and we believe it will be found highly useful. There is one danger which we cannot but point out to a student who uses such a book. He must on no account rest satisfied with ability to answer the questions in it, but should, as far as possible, repeat many of the experiments involved in the questions himself, even though his results should be only approximately true.

The Building of the British Isles.—A Study in Geographical Evolution. By A. J. Jukes-Browne, B.A., F.G.S. London: George Bell and Sons.

We have to acknowledge the thorough satisfaction with which we have read through the pages of this delightful book. The attempt to realise the successive appearances which our island home has presented since its foundations were laid in the Palæozoic rocks of the west has been made with the most pleasing result. The author sets out with the acknowledged truth that the existing geographical and physical contours of the British Isles are the outcome of the long and varied geological history which this particular part of the world possesses. We are then introduced in turn to the magnificent and almost complete series of rocks which find a place in some part or other of the British area, and under the guidance of a master-hand we are enabled 'to picture out' the manner in which each was formed, together with the physical and geographical conditions which Britain for the time being possessed. In the effort the reader is very greatly assisted by no less than fifteen full-page maps, showing most vividly that there have been many different arrangements of land and sea over the area where the British Isles now stand; that every part of our country has been

repeatedly depressed beneath the sea—some portions much more frequently than others—and conversely every part of the area which is now covered by the environing seas has more than once been part of the dry land; that sometimes nearly the whole area has formed part of continental land, and at other times it has been almost entirely submerged beneath the sea. The stories of vanishing continents, whose highest summits slowly and with apparent reluctance disappear; of emerging land, whose monotonous outline as it continues to rise is carved by the ever active agents of waste into variety and beauty of contour; these are told with scientific precision and fairy-like effect. Take for example the last great movement which affected the area of Great Britain:

'So long as the British coast-line lay near the contour of 80 fathoms, our modern streams were but tributaries of the three great rivers which ran outside the present limits of Great Britain; that to the east being a continuation of the Rhine, that to the south a prolongation of the Seine, and that to the west a river to which no modern name can be applied, but of which all the rivers of western England, southern and eastern Ireland, were the tributaries.

'It was not long, however, before a movement set in, and subsidence caused a rapid recession of the coast line; the North Sea crept southward over the plains between England and Holland, while the Atlantic crept round Ireland and up the valley of the English channel till only a narrow isthmus separated England from France. It is not unlikely that the actual straits are the site of a valley formed by a river which ran northward nearer France than England, and cut through the northern escarpment of the chalk as the Stour and Medway do at the present day, while a second stream ran south-westward, nearer the British coast, and cut through the continuation of the South Downs east of Beachy Head. The watershed between these two rivers is possibly marked by the line of sandbanks which runs southward from the Varne Bank.... Subsidence under these circumstances would enable the sea to creep up the valleys of the two rivers, and eventually to submerge part of the low watershed between them. Waves and currents would soon widen the breach, and THESE HAVE CONTINUED TO WIDEN IT FROM THAT TIME TO THE PRESENT DAY.'

Thus was Britain finally separated from the continent to which it had been united throughout the greater part of Tertiary time, and thus was the geographical evolution of the British Isles at length accomplished.

The reader who for the first time becomes acquainted with the unstable condition of the solid earth, and whose faith in the everlasting hills becomes thereby weakened, may, perhaps, find sufficient to still his misgivings in the following paragraph:—

'Minor changes are even now in progress, and there is no reason to suppose that the present arrangement of land and sea is the final geographical condition of Europe, or that the British Isles will never again be subjected to movements of upheaval and depression like those which they have experienced in the past. It is very probable, however, that the period in which we are now living is one of those quiescent times which, as we have seen, generally succeed periods of rapid movement and disturbance. The earth's crust appears to be in a comparatively fixed and stable condition, and the movements which are known to be in progress are so slight, or rather the rate of change is so slow in relation to the short span of human life, that we may safely rely on the permanency of the present geographical conditions for a very long period of future time.'

Sonntag's French Grammar: Part III. London: Blackie and Son.

The third part of this grammar is continued on the same lines as the two preceding parts, abundant exercise in the use of new grammatical forms being provided on their introduction. It is an eminently practical grammar.

In our 'Publications Received' will be found a list of new Prize Books. Our next issue will contain special reviews of the Prizes of the Season.

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ELEMENTARY COMMERCIAL GEOGRAPHY.

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Recent examinations for Commercial Certificates by the Universities of Oxford and Cambridge, and by the Society of Arts, have brought the want of an adequate school-book of Commercial Geography into prominence. The study of Commercial Geography has been so recently introduced into British Schools that some uncertainty exists as to its scope and limits. This little volume attempts to define and illustrate the subject in a manner simple enough to be readily worked through in schools, and sufficiently accurate to serve for reference. Part I. deals with the commodities which enter into trade, with means of transport, and with those facts of commerce and politics which bear directly on Geography. Part II. treats of the countries of the world, the great commercial powers individually, and the less important in groups with less detail. Characteristic resources, the chief commercial towns and main traffic routes, are always described in their relation to the physical features of each region.

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